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Occupational Employment in Manufacturing Industries

U.S. Department of Labor
Bureau of Labor Statistics
December 1985

Bulletin 2248

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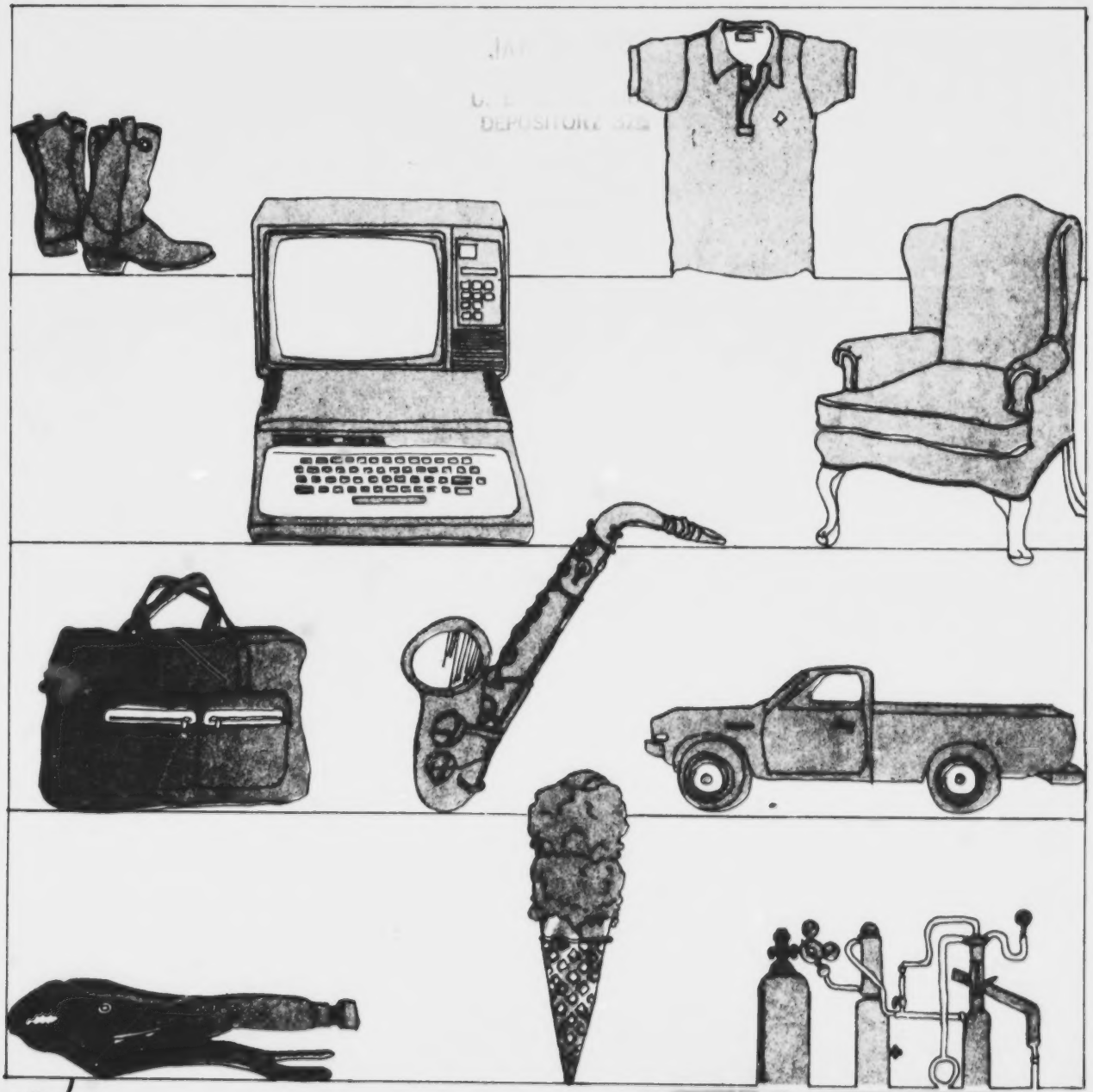

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Occupational Employment in Manufacturing Industries

U.S. Department of Labor
William E. Brock, Secretary

Bureau of Labor Statistics
Janet L. Norwood, Commissioner
December 1985

Bulletin 2248

Preface

This bulletin provides data from a 1983 survey of occupational employment in manufacturing industries. Earlier surveys of manufacturing industries were conducted in 1971, 1974, 1977, and 1980. These surveys were supplemented with the financial assistance of the National Science Foundation. Results of the 1980 survey were published in Bulletin 2133, *Occupational Employment in Manufacturing Industries.*

The nonmanufacturing sector was surveyed in 1981 and 1982. Results of the 1981 survey were published in Bulletin 2186, *Occupational Employment in Mining Construction, Finance, and Services.* Data for the 1982 survey were published in Bulletin 2220, *Occupational Employment in Transportation, Communications, Utilities, and Trade.*

These periodic surveys are part of a Federal-State cooperative program of occupational employment statistics (OES). The OES program provides information for many data users, including individuals and organizations engaged in planning vocational education programs, training programs supported by the Job Partnership Training Act, and higher education. OES data are also used to prepare information for career counseling, for job placement activities performed at State employment security offices, and for personnel planning and market research conducted by private enterprises.

This bulletin was prepared in the Office of Employment and Unemployment Statistics, Division of Occupational and Administrative Statistics, by Thomas P. Williams and Barbara L. Keitt under the direction of Glyn Finley. Kevin Tidemann provided data processing support.

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Introduction

The Occupational Employment Statistics (OES) Survey is designed to collect data on occupational employment of wage and salary workers by industry in nonagricultural establishments. The Bureau of Labor Statistics provides the procedures and technical assistance for the survey, and State employment security agencies collect the data.

In 1983, 50 States, the District of Columbia, and Puerto Rico participated in the survey, compared with 49 States in 1980, 43 States in 1977, and 29 States in 1974. Data for Puerto Rico are not included in the estimates in this publication. They are available, as are data for each State, from employment security agencies listed on the inside back cover of this bulletin.

Data presented

This bulletin presents national data on occupational employment for 2-digit SIC industries.[1] Data are presented for each industry under the following headings: Employment, percent of total employment, relative error, and percent of establishments reporting the occupation.

Employment is based upon survey results adjusted to reflect total industry employment. The percent of total employment refers to total employment in a particular industry. Relative error measures the level of confidence to be placed in each estimate. The percentage of establishments reporting a particular occupation indicates the frequency of occurrence of the occupation.

Occupations with fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 percent are not shown separately but are included in the appropriate residual categories. Employment is rounded to the nearest ten. The relative error and percent of respondents reporting the occupation are rounded to the nearest whole percent. The percent of total employment was computed from rounded employment data.

[1] Occupational employment data at the more detailed 3-digit level are available upon request from the Office of Employment and Unemployment Statistics, Bureau of Labor Statistics. Definitions for all occupations surveyed are also available upon request.

Summary

In 1983, manufacturing employment covered by this survey totaled 18.4 million, or about 20 percent[1] of all nonagricultural wage and salary workers in the Nation.

As shown in table 1, three-fifths of these workers were employed in the durable goods segment of manufacturing. Representing more than half of durable goods employment were the machinery, electrical and electronic equipment, and transportation equipment industries. The nondurable goods industries constituted 40 percent of manufacturing employment. Among these, the largest were food and kindred products, apparel and other textile products, and the printing and publishing industry, together accounting for over half of nondurable goods employment.

Major occupational groups

A new occupational classification system, designed to better suit the needs of both data users and data producers, was used for the first time in this survey. First, it emphasizes occupations of special interest, such as technology-related occupations, and those requiring substantial training. Additionally, it is more compatible with the Standard Occupational Classification System used for a variety of other occupational data. Also, to aid data collectors and respondents, the new structure is more concise. A detailed explanation of the new classification system is given in appendix B.

Under the new classification system, workers are classified by occupation into seven major occupational groups: Managerial and administrative workers; professional, paraprofessional, and technical workers; sales and related workers; clerical and administrative support workers; service workers; agriculture, forestry, fishing, and related workers; and production, construction, operating, maintenance, and material handling workers. Tables 2 and 3 present the distribution of employment in the various industries surveyed.

The following sections discuss each of these occupational groups and their distribution among the surveyed industries. Subsequent sections deal with the industry segments within manufacturing and discuss employment in each by major occupational group. Throughout, changes in occupational employment arising from changes in classification since the last survey, rather than actual changes in establishment staffing patterns, are noted. These sections also present detailed occupational employment data by industry segment (2-digit SIC).

Managerial and administrative workers

Persons holding positions as managerial and administrative workers are primarily concerned with policymaking, planning, organizing, staffing, directing, and controlling activities common to many types of organizations. Occupations included in this group are plant, office, and sales managers and corporate officers such as president, secretary, and treasurer. First-line supervisors, such as blue-collar worker and clerical supervisors, however, are included in the same occupational division as the workers they supervise. The new coding structure incorporates a new classification: First-line supervisor—sales. These supervisory workers are now included in the sales rather than in the managers/administrators group. (See appendix B.)

In 1983, managerial and administrative workers numbered more than 1 million, representing nearly 6 percent of total employment in the manufacturing sector. The durable goods segment employed three-fifths of the workers in this occupational group. The largest concentrations of managerial and administrative workers were found in the machinery and electrical and electronic equipment industries.

Professional, paraprofessional, and technical workers

Persons employed in professional positions usually deal with the theoretical or practical aspects of such fields as science, engineering, art, education, medicine, law, and business relations. Most of these occupations require substantial educational preparation, usually at the university level. Paraprofessionals work under the direction of professionals. These occupations usually require some postsecondary education or, in some instances, a baccalaureate degree. Technical occupations require knowledge of fundamental scientific, engineering, mathematical, computer programming, or draft

[1] Total employment for nonagricultural establishments averaged 90.1 million in 1983. See *Supplement to Employment and Earnings*, U.S. Department of Labor, Bureau of Labor Statistics, July 1984.

design principles. This knowledge is acquired through study at technical schools and junior colleges, through other formal postsecondary training less extensive than a 4-year college course, or through equivalent on-the-job training or experience.

In 1983, professional, paraprofessional, and technical workers numbered 2 million, representing 11 percent of total employment in the manufacturing sector. The durable goods segment employed 72 percent of the workers in this occupational group. The largest concentrations of professional, paraprofessional, and technical workers were found in the electrical and electronic equipment and transportation equipment industries.

Sales workers

In the manufacturing sector, sales workers primarily include persons who are required to have specific knowledge of the commodity or service being sold, in contrast to retail trade, in which sales workers sell any of a large variety of goods or services and usually are only required to have familiarity with the pricing of those goods and services.

Sales representatives include those who sell commodities on a wholesale basis to wholesale, retail, industrial, professional, or other establishments. They solicit orders from established clientele and attempt to secure new customers; show samples or catalog illustrations of products to prospective buyers and explain their merit; quote prices and credit and discount terms; arrange delivery schedules; process orders to offices or warehouses; resolve customer complaints; and keep informed of the latest market conditions, product innovations, and price changes. Sales engineers include occupations primarily concerned with selling to businesses goods and services where a technical background equivalent to a degree in engineering is required.

In 1983, sales workers numbered approximately 540,000, representing 3 percent of total employment in the manufacturing sector. The nondurable goods segment employed 56 percent of the workers in this occupational group. The largest concentrations of sales workers were found in the printing and publishing and food and kindred products industries.

Unlike other major occupational groups within the manufacturing sector, the number of sales workers increased between 1980 and 1983. Employment of sales workers in manufacturing increased by over 20,000 despite a drop of 1.8 million in total manufacturing employment.[2]

[2] This increase was derived by adjusting the 1983 survey data for changes in the OES coding structure. Specifically, employment totals for "sales engineers" and "first-line supervisors—sales" were deducted from 1983 manufacturing data, as these occupations were not included in the sales group in prior surveys.

Clerical and administrative support workers

Persons employed in this occupational group are concentrated in five categories: First-line supervisors—clerical; selected secretarial and general office occupations; electronic data processing and other office machine occupations; selected communication, mail, and message distributing occupations; and material recording, scheduling, dispatching, and distributing occupations. The last group is comprised of plant clerical workers who plan, coordinate, or expedite production and the flow of work. They are also involved in the clerical aspects of receiving, storing, issuing, or shipping of materials, merchandise, supplies, or equipment. The other (nonsupervisory) groups are primarily comprised of office clerical workers who prepare, systematize, transcribe, transfer, or preserve written communication and records, as well as collect accounts and distribute information.

Clerical workers ranked second among the seven major occupational groups, with 2.2 million workers, or 12 percent of total employment in the manufacturing sector in 1983. The durable goods segment employed 56 percent of the workers in this occupational group. The largest concentrations of clerical workers were found in the machinery and printing and publishing industries.

Service workers

Persons in this occupational group perform services for individuals or establishments. Service workers protect individuals and property, prepare and serve food and beverages, and clean interiors and equipment of buildings, offices, stores, and vehicles, etc.

In 1983, service workers numbered over 325,000, representing almost 2 percent of total employment in the manufacturing sector. The durable goods segment employed 54 percent of the workers in this occupational group. The largest concentrations of service workers were found in the food and kindred products and transportation equipment industries.

Agriculture, forestry, fishing, and related workers

Persons employed in this occupational group were concentrated in lumber and wood products (SIC 24) and, to a lesser degree, in food and kindred products (SIC 20). This category includes forestry workers such as choke setters, log handling equipment operators, nursery workers, and conservation workers. Agricultural workers include persons in occupations such as graders and sorters of agricultural products; groundskeepers and gardeners, except farm; and farm equipment operators. In 1983, fewer than 100,000 persons were employed in agriculture, forestry, fishing, and related occupations, representing about one-half of 1 percent of total employment in the manufacturing sector.

Production, construction, operating, maintenance, and material handling occupations

This occupational group, referred to hereafter in the text as production and related workers, includes all skilled, semiskilled, and unskilled workers performing machine and manual tasks. This was by far the largest of the seven major occupational groups, accounting for over 12.1 million workers, or 66.3 percent of total manufacturing employment in 1983. Nearly three-fifths of the workers in this group were in durable goods industries. The largest concentrations of production and related workers were found in the electrical and electronic equipment industries and the food and kindred products industries.

Table 1. Employment in manufacturing industries, 1983

Industry	Employment	Percent of total manufacturing employment
Total	18,369,380	100.0
Durable goods industries, total	10,700,830	58.3
Lumber and wood products, except furniture	645,130	3.5
Furniture and fixtures	439,250	2.4
Stone, clay, glass, and concrete products	570,300	3.1
Primary metal products	827,560	4.5
Fabricated metal products	1,369,000	7.5
Machinery, except electrical and transportation equipment	2,026,830	11.0
Electrical and electronic machinery	2,017,110	11.0
Transportation equipment	1,747,670	9.5
Instruments and related products	688,150	3.7
Miscellaneous manufacturing industries	369,830	2.0
Nondurable goods industries, total	7,668,550	41.7
Food and kindred products	1,618,130	8.8
Tobacco products	62,060	.3
Textile mill products	731,690	4.0
Apparel and other textile products	1,141,020	6.2
Paper and allied products	653,480	3.6
Printing and publishing	1,286,710	7.0
Chemicals and allied products	1,053,520	5.7
Petroleum refining and related industries	196,960	1.1
Rubber and miscellaneous plastics products	719,440	3.9
Leather and leather products	205,540	1.1

Table 2. Employment in manufacturing industries by major occupational group, 1983

Industry	Managers and administrative workers	Professional, paraprofessional, and technical workers	Sales and related workers	Clerical and administrative support workers	Agriculture, forestry, fishing, and related workers	Production, construction, operating, maintenance, and material handling workers	Service workers
Total	1,062,330	2,012,940	540,560	2,150,890	92,300	12,184,580	325,790
Food and kindred products	77,720	58,200	68,300	152,320	16,100	1,192,260	53,240
Tobacco products	2,470	4,220	3,020	4,500	40	45,870	1,930
Textile mill products	25,460	19,940	7,700	58,940	430	605,450	13,780
Apparel and other textile products	35,430	17,410	19,100	98,130	130	957,550	13,280
Lumber and wood products, except furniture	30,240	13,360	12,270	42,540	66,240	489,820	10,660
Furniture and fixtures	19,690	11,090	12,430	39,600	120	350,090	6,230
Paper and allied products	31,490	41,250	20,450	63,120	2,960	484,860	9,350
Printing and publishing	91,520	147,490	123,570	302,560	230	602,150	19,200
Chemicals and allied products	86,400	202,040	38,270	153,900	2,520	546,840	23,560
Petroleum refining and related industries	10,770	37,420	4,810	24,770	40	117,050	2,110
Rubber and miscellaneous plastics products	40,800	36,000	14,620	63,640	260	553,380	10,740
Leather and leather products	8,130	3,820	4,680	19,780	40	166,650	2,440
Stone, clay, glass, and concrete products	33,880	26,740	15,110	53,680	270	433,220	7,400
Primary metal products	36,630	54,920	12,370	74,110	260	632,910	16,360
Fabricated metal products	82,190	92,580	35,840	127,560	410	1,010,290	20,130
Machinery, except electrical and transportation equipment	149,820	340,620	63,060	287,560	780	1,153,170	31,830
Electrical and electronic machinery	123,420	401,800	34,460	243,560	440	1,183,940	29,500
Transportation equipment	94,310	352,670	11,190	179,220	700	1,072,720	36,860
Instruments and related products	56,980	132,570	25,670	109,590	250	351,250	11,830
Miscellaneous manufacturing industries	24,970	18,830	13,660	51,810	90	255,110	5,370

Table 3. Percent distribution of employment in manufacturing industries by major occupational group, 1983

Industry	All occupations	Managers and administrative workers	Professional, paraprofessional, and technical workers	Sales and related workers	Clerical and administrative support workers	Agriculture, forestry, fishing, and related workers	Production, construction, operating, maintenance, and material handling workers	Service workers
Total	100.0	5.8	11.0	2.9	11.7	0.5	66.3	1.8
Food and kindred products	100.0	4.8	3.6	4.2	9.4	1.0	73.7	3.3
Tobacco products	100.0	4.0	6.8	4.9	7.2	.1	73.9	3.1
Textile mill products	100.0	3.5	2.7	1.1	8.1	.1	82.7	1.9
Apparel and other textile products	100.0	3.1	1.5	1.7	8.6	.0	83.9	1.2
Lumber and wood products, except furniture	100.0	4.7	2.1	1.9	6.6	10.3	72.8	1.7
Furniture and fixtures	100.0	4.5	2.5	2.8	9.0	.0	79.7	1.4
Paper and allied products	100.0	4.8	6.3	3.1	9.7	.5	74.2	1.4
Printing and publishing	100.0	7.1	11.5	9.6	23.5	.0	46.8	1.5
Chemicals and allied products	100.0	8.2	19.2	3.6	14.6	.2	51.9	2.2
Petroleum refining and related industries	100.0	5.5	19.0	2.4	12.6	.0	59.4	1.1
Rubber and miscellaneous plastics products	100.0	5.7	5.0	2.0	8.8	.0	76.9	1.5
Leather and leather products	100.0	4.0	1.9	2.3	9.6	.0	81.1	1.2
Stone, clay, glass, and concrete products	100.0	5.9	4.7	2.6	9.4	.0	76.0	1.3
Primary metal products	100.0	4.4	6.6	1.5	9.0	.0	76.5	2.0
Fabricated metal products	100.0	6.0	6.8	2.6	9.3	.0	73.8	1.5
Machinery, except electrical and transportation equipment	100.0	7.4	16.8	3.1	14.2	.0	56.9	1.6
Electrical and electronic machinery	100.0	6.1	19.9	1.7	12.1	.0	58.7	1.5
Transportation equipment	100.0	5.4	20.2	.6	10.3	.0	61.4	2.1
Instruments and related products	100.0	8.3	19.3	3.7	15.9	.0	51.0	1.7
Miscellaneous manufacturing industries	100.0	6.8	5.1	3.7	14.0	.0	69.0	1.5

Food and Kindred Products

Establishments which manufacture or process foods, beverages, and certain related items for human consumption employed 1.6 million workers, accounting for 9 percent of manufacturing and one-fifth of nondurable goods employment in 1983. The three largest employers of these workers were: Establishments processing and packing meat, pork, poultry, and eggs, with 21 percent of industry employment; establishments manufacturing beverages, 14 percent; and establishments canning and preserving fruits and vegetables, also with 14 percent.

Total employment in the food and kindred products industry declined by 4.5 percent between 1980 and 1983. Employment since 1977 by major occupational group is given in text table 1.

As shown in table 4, the 1.2 million production and related workers in the food and kindred products industry accounted for nearly three-fourths of total industry employment. Clerical workers ranked second with 9 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 5 percent; professional, paraprofessional, and technical workers, 4 percent; sales workers, 4 percent; and service workers, 3 percent.

The five most populous occupations in food and kindred products manufacturing are listed in the tabulation below. These jobs, all of which are in the production category, made up over one-quarter of total industry employment.

	Employment	*Percent of industry employment*
Packaging and filling machine operators and tenders	120,630	7.4
Meat, poultry, and fish cutters and trimmers, hand	94,240	5.8
Driver/sales workers	76,650	4.7
Cannery workers	74,950	4.6
Hand packers and packagers	74,280	4.6

Text table 1. Food and kindred products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,710,910	1,695,830	1,618,130	-5.4
Managerial and administrative workers	108,480	107,750	[1]77,720	-28.4
Professional, paraprofessional, and technical workers	41,950	57,360	58,200	38.7
Sales workers	62,880	66,910	68,300	8.6
Clerical workers	170,470	169,730	152,320	-10.6
Production and related workers	1,259,250	1,241,080	[2]1,208,360	-4.0
Service workers	67,880	52,000	53,240	-21.6

[1] A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. The addition of five first-line supervisor occupations to the production group suggests that respondents may have shifted some managerial employment into the production category. Additionally, employment for "first-line supervisor—sales would previously have been included with the managerial group.

[2] Includes 16,000 agriculture, forestry, fishing, and related workers who would have been classified as production and related workers in previous surveys.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 20)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,618,150	100.00	—	—
Managerial and administrative occupations	77,730	4.80	n.a.	n.a.
Financial managers	5,370	.33	3	17
Personnel, training, and labor relations managers	3,380	.21	2	14
Purchasing managers	2,210	.14	2	10
Marketing, advertising, and public relations managers	7,420	.46	3	13
Administrative services managers	2,400	.15	6	7
Industrial production managers	9,700	.60	3	19
General managers and top executives	37,580	2.32	1	78
All other managers and administrators	9,670	.60	5	11
Professional, paraprofessional, and technical occupations	58,200	3.60	n.a.	n.a.
Management support workers	21,760	1.34	n.a.	n.a.
Accountants, auditors, and other financial specialists	10,490	.65	n.a.	n.a.
Accountants and auditors	9,040	.56	2	25
Budget analysts	620	.04	6	2
All other financial specialists	830	.05	9	1
Purchasing agents and buyers, farm products	2,470	.15	4	7
Purchasing agents, except wholesale and retail trade, and farm products	2,610	.16	3	10
Personnel, training, and labor relations specialists	1,880	.12	4	6
Cost estimators	400	.02	5	2
Compliance officers and enforcement inspectors, except construction	730	.05	9	2
All other management support workers	3,180	.20	7	4
Engineers	7,720	.48	n.a.	n.a.
Chemical engineers	560	.03	11	1
Agricultural engineers	200	.01	14	1
Industrial engineers, except safety	2,060	.13	6	6
Safety engineers, except mining	350	.02	8	2
Mechanical engineers	3,300	.20	6	7
All other engineers	1,250	.08	8	2
Engineering and related technicians and technologists	2,010	.12	n.a.	n.a.
Industrial engineering technicians and technologists	300	.02	11	1
Mechanical engineering technicians and technologists	220	.01	11	1
Drafters	740	.05	7	3
All other engineering and related technicians and technologists	750	.05	11	1
Physical scientists	4,120	.25	n.a.	n.a.
Chemists, except biochemists	3,850	.24	4	6
All other physical scientists	270	.02	12	1
Life scientists	2,240	.14	n.a.	n.a.
Agricultural and food scientists	1,100	.07	10	2
Biological scientists	850	.05	8	2
All other life scientists	290	.02	14	(*)
Physical and life science technicians and technologists	10,400	.64	n.a.	n.a.
Biological, agricultural, and food technicians and technologists, except health	4,320	.27	6	4
Chemical technicians and technologists, except health	4,540	.28	4	5
All other physical and life science technicians and technologists	1,540	.10	10	1
Computer scientists and related workers	5,520	.34	n.a.	n.a.

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 20)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Systems analysts, electronic data processing	1,890	0.12	6	4
Computer programmers	2,630	.16	6	6
All other computer systems analysts, programmers, and programmer aides	1,000	.06	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers	1,080	.07	n.a.	n.a.
Public relations specialists and publicity writers	600	.04	11	1
All other professional, paraprofessional, and technical workers	2,750	.17	n.a.	n.a.
Sales and related occupations	68,300	4.22	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	10,990	.68	3	11
Sales representatives, scientific and related products and services, except retail	6,580	.41	5	8
Sales representatives, except scientific and related products or services and retail	29,590	1.83	3	29
Salespersons, retail	13,340	.82	4	7
Cashiers	4,110	.25	6	5
All other sales and related workers	3,690	.23	6	4
Clerical and administrative support occupations	152,310	9.41	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	6,170	.38	4	15
Secretaries	20,700	1.28	3	41
Stenographers	790	.05	18	1
Receptionists and information clerks	1,760	.11	2	9
Typists	2,240	.14	5	5
Typists, word processing equipment	860	.05	7	2
Personnel clerks, except payroll and timekeeping	2,120	.13	2	9
File clerks	790	.05	5	3
Order clerks, materials, merchandise, and service	5,390	.33	2	14
Procurement clerks	1,150	.07	3	5
Bookkeeping, accounting, and auditing clerks	23,740	1.47	2	51
Payroll and timekeeping clerks	3,760	.23	2	16
Billing, cost and rate clerks	5,050	.31	3	12
General office clerks	23,880	1.48	2	45
Electronic data processing and other office machine operators	8,840	.55	n.a.	n.a.
Billing, posting, and calculating machine operators	1,370	.08	6	3
Computer operators, except peripheral equipment	2,430	.15	3	8
Data entry keyers, except composing	4,620	.29	3	10
All other office machine operators	420	.03	9	1
Switchboard operators	1,930	.12	2	11
Material recording, scheduling, dispatching, and distributing workers	40,940	2.53	n.a.	n.a.
Production, planning, and expediting clerks	3,360	.21	3	8
Weighers, measurers, checkers, and samplers, recordkeeping	5,780	.36	3	11
Stock clerks, stockroom, warehouse or storage yard	8,750	.54	3	17
Traffic, shipping, and receiving clerks	21,210	1.31	2	36
All other material recording, scheduling, and distributing workers	1,840	.11	7	2
All other clerical and administrative support workers	2,200	.14	7	3
Service occupations	53,250	3.29	n.a.	n.a.

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 20)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, service	3,610	0.22	4	7
Guards and watch guards	4,770	.29	3	7
Food and beverage preparation and service workers	4,150	.26	9	3
Cleaning and building service workers, except private households	39,180	2.42	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	36,490	2.26	1	41
Elevator operators	240	.01	11	(*)
All other cleaning and building service workers, except private households	2,450	.15	9	3
All other service workers	1,540	.10	11	1
Agriculture, forestry, fishing, and related occupations	16,100	.99	n.a.	n.a.
First-line supervisors-agricultural, forestry, fishing, and related workers	1,380	.09	7	2
Graders and sorters, agricultural products	7,190	.44	6	5
Gardeners and groundskeepers, except farm	730	.05	8	2
Farm equipment operators	2,780	.17	8	2
All other agriculture, forestry, fishing, and related workers	4,020	.25	10	1
Production, construction, operating, maintenance, and material handling occupations	1,192,260	73.68	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	65,960	4.08	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	6,860	.42	3	13
First-line supervisors and manager/supervisors - construction trades and extractive workers	690	.04	12	1
First-line supervisors and manager/supervisors - production and operating workers	48,990	3.03	1	58
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	4,470	.28	3	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	4,950	.31	4	6
Precision inspectors, testers, and graders	1,610	.10	8	2
Production inspectors, testers, graders, sorters, samplers, and weighers	18,260	1.13	4	17
Mechanics, installers, and repairers	97,640	6.03	n.a.	n.a.
Machinery maintenance mechanics	32,370	2.00	2	27
Millwrights	2,210	.14	8	2
Machinery maintenance workers	4,610	.28	4	6
Maintenance repairers, general utility	35,880	2.22	2	39
Automotive mechanics	5,360	.33	3	11
Bus and truck mechanics and diesel engine specialists	5,270	.33	3	8
Farm equipment mechanics	960	.06	13	1
Heating, air conditioning, and refrigeration mechanics and installers	1,940	.12	4	4
Precision instrument repairers	950	.06	8	1
Mechanical control and valve installers and repairers	300	.02	13	(*)
Coin and vending machine servicers and repairers	5,760	.36	3	7
All other mechanics, installers, and repairers	2,030	.13	8	2
Construction trades workers, except material moving	11,390	.70	n.a.	n.a.

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 20)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Carpenters	1,180	0.07	5	3
Electricians	5,770	.36	4	8
Painters and paperhangers, construction and maintenance	1,320	.08	6	4
Plumbers, pipefitters, and steamfitters	1,840	.11	8	2
All other construction trades workers	1,280	.08	19	1
Precision metal workers	5,180	.32	n.a.	n.a.
Machinists	3,660	.23	8	4
Sheet- metal workers	880	.05	9	1
Boilermakers	470	.03	9	1
All other precision metal workers	170	.01	19	(*)
Precision food workers	109,850	6.79	n.a.	n.a.
Slaughterers and butchers	56,390	3.48	2	8
Bakers, manufacturing	27,780	1.72	3	9
Food batchmakers	19,050	1.18	3	14
All other precision food and tobacco workers	6,630	.41	9	2
Precision workers, nec	500	.03	26	(*)
Machine setters, set-up operators, and tenders, except metal and plastic	250,130	15.46	n.a.	n.a.
Cooking machine operators and tenders, food and tobacco	13,370	.83	3	14
Roasting, baking, and drying machine operators and tenders, food and tobacco	11,830	.73	4	9
Boiler operators and tenders, low pressure	2,350	.15	4	4
Cooling and freezing equipment operators and tenders	5,330	.33	5	5
Dairy processing equipment operators, including setters	16,700	1.03	3	8
Cutting and slicing machine setters and set-up operators	920	.06	11	1
Cutting and slicing machine operators and tenders	8,980	.55	4	8
Coating, painting, and spraying machine operators and tenders	930	.06	11	1
Cleaning, washing, and pickling equipment operators and tenders	3,410	.21	5	3
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	10,630	.66	4	8
Crushing, grinding, mixing, and blending machine operators and tenders	27,090	1.67	2	25
Extruding, forming, pressing, and compacting machine setters and set-up operators	2,960	.18	14	1
Extruding, forming, pressing, and compacting machine operators and tenders	9,300	.57	4	9
Packaging and filling machine operators and tenders	120,630	7.45	2	42
All other machine setters and set-up operators, except metal and plastic	3,840	.24	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	11,860	.73	9	4
Other hand workers, nec	188,360	11.64	n.a.	n.a.
Cannery workers	74,950	4.63	2	9
Meat, poultry, and fish cutters and trimmers, hand	94,240	5.82	1	10
Molders and casters, hand	1,160	.07	15	1
All other hand workers, nec	18,010	1.11	7	3
Plant and system workers	3,710	.23	n.a.	n.a.
Stationary engineers	2,110	.13	5	3
All other plant and system operators	1,600	.10	10	2
Motor vehicle operators	145,390	8.98	n.a.	n.a.
Truck drivers, heavy or tractor trailer	43,820	2.71	2	36

See footnotes at end of table.

Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 20)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Truck drivers, light, include delivery and route workers	24,080	1.49	3	23
Driver/sales workers	76,650	4.74	2	24
All other motor vehicle operators	840	.05	8	1
All other transportation and motor vehicle operators	1,170	.07	9	1
Material moving equipment operators	46,370	2.87	n.a.	n.a.
Hoist and winch operators	310	.02	11	1
Industrial truck and tractor operators	37,390	2.31	2	28
Conveyor operators and tenders	4,440	.27	6	3
Pump operators	1,390	.09	10	1
All other material moving equipment operators	2,840	.18	8	2
Helpers - mechanics and repairers	3,000	.19	5	4
Construction trades and extractive worker helpers	660	.04	14	1
Machine feeders and offbearers	18,010	1.11	4	10
Freight, stock, and material movers, hand	34,500	2.13	2	22
Hand packers and packagers	74,280	4.59	2	23
Vehicle washers and equipment cleaners	12,420	.77	3	11
All other helpers, laborers, and material movers, hand	103,870	6.42	2	18

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Tobacco Products

The manufacture of tobacco products employed 62,060 workers in 1983, or only 0.3 percent of manufacturing and 1 percent of nondurable goods employment. Most workers were employed within establishments manufacturing cigarettes, which accounted for 76 percent of industry employment. Establishments primarily engaged in the stemming and redrying of tobacco accounted for 9 percent of industry employment.

While total employment levels remained constant for the tobacco products industry between 1980 and 1983, clerical and managerial and administrative jobs declined by close to 35 percent. Conversely, professional, paraprofessional, and technical jobs increased by 17 percent. Shifts in employment since 1977 can be seen in text table 2.

The industry's 45,870 production and related workers accounted for 74 percent of total industry employment (table 5). Clerical workers ranked second with over 7 percent. The remaining employment was distributed as follows: Professional, paraprofessional, and technical workers, 7 percent; sales workers, 5 percent; managerial and administrative workers, 4 percent; and service workers, 3 percent.

The five most populous occupations in manufacturing tobacco products are listed below. These production occupations made up more than one-fourth of total industry employment.

	Employment	*Percent of industry employment*
Packaging and filling machine operators and tenders	6,680	10.8
Machinery maintenance mechanics	3,780	6.1
First-line supervisors, production	2,730	4.4
Production inspectors, testers, graders, sorters, samplers, and weighers	2,510	4.0
Industrial truck and tractor operators	1,590	2.6

Text table 2. Tobacco products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	70,940	63,600	62,060	-12.5
Managerial and administrative workers	3,360	3,780	[1]2,470	-26.5
Professional, paraprofessional, and technical workers	4,680	3,600	4,220	-9.8
Sales workers	490	760	3,020	516.3
Clerical workers	6,550	6,960	4,500	-31.3
Production and related workers	52,450	46,270	45,870	-12.5
Service workers	3,410	2,230	1,930	-43.4

[1] A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. See footnote 1 to text table 1.

Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 21)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	62,060	100.00	—	—
Managerial and administrative occupations	2,470	3.98	n.a.	n.a.
Financial managers	150	.24	6	19
Personnel, training, and labor relations managers	90	.15	9	17
Purchasing managers	80	.13	14	11
Administrative services managers	50	.08	11	8
Industrial production managers	430	.69	8	22
General managers and top executives	650	1.05	5	80
All other managers and administrators	1,020	1.64	n.a.	n.a.
Professional, paraprofessional, and technical occupations	4,230	6.82	n.a.	n.a.
Management support workers	1,470	2.37	n.a.	n.a.
Accountants, auditors, and other financial specialists	390	.63	n.a.	n.a.
Accountants and auditors	270	.44	12	26
All other financial specialists	120	.19	n.a.	n.a.
Purchasing agents and buyers, farm products	510	.82	11	24
Purchasing agents, except wholesale and retail trade, and farm products	110	.18	8	14
Personnel, training, and labor relations specialists	240	.39	20	15
All other management support workers	220	.35	n.a.	n.a.
Engineers	780	1.26	n.a.	n.a.
Industrial engineers, except safety	80	.13	11	12
Mechanical engineers	240	.39	16	12
All other engineers	460	.74	n.a.	n.a.
Engineering and related technicians and technologists	370	.60	n.a.	n.a.
Drafters	80	.13	13	9
All other engineering and related technicians and technologists	290	.47	n.a.	n.a.
Physical scientists	240	.39	n.a.	n.a.
Physical and life science technicians and technologists	550	.89	n.a.	n.a.
Computer scientists and related workers	360	.58	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers	110	.18	12	16
All other professional, paraprofessional, and technical workers	350	.56	n.a.	n.a.
Sales and related occupations	3,020	4.87	n.a.	n.a.
Sales representatives, except scientific and related products or services and retail	310	.50	13	16
All other sales and related workers	2,710	4.37	n.a.	n.a.
Clerical and administrative support occupations	4,510	7.27	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	360	.58	19	27
Secretaries	880	1.42	15	54
Typists	120	.19	11	16
Personnel clerks, except payroll and timekeeping	90	.15	14	13
Order clerks, materials, merchandise, and service	130	.21	8	13
Procurement clerks	70	.11	11	8
Bookkeeping, accounting, and auditing clerks	420	.68	8	44
Payroll and timekeeping clerks	210	.34	10	32
Billing, cost and rate clerks	80	.13	15	11
General office clerks	850	1.37	18	44

See footnotes at end of table.

Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 21)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Electronic data processing and other office machine operators	270	0.44	n.a.	n.a.
Computer operators, except peripheral equipment	90	.15	10	13
Data entry keyers, except composing	120	.19	11	16
All other office machine operators	60	.10	n.a.	n.a.
Material recording, scheduling, dispatching, and distributing workers	610	.98	n.a.	n.a.
Production, planning, and expediting clerks	100	.16	12	12
Stock clerks, stockroom, warehouse or storage yard	240	.39	8	29
Traffic, shipping, and receiving clerks	190	.31	7	31
All other material recording, scheduling, and distributing workers	80	.13	n.a.	n.a.
All other clerical and administrative support workers	420	.68	n.a.	n.a.
Service occupations	1,930	3.11	n.a.	n.a.
First-line supervisors and manager/supervisors, service	90	.15	12	11
Guards and watch guards	460	.74	5	24
Cleaning and building service workers, except private households	1,280	2.06	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	1,180	1.90	9	39
All other cleaning and building service workers, except private households	100	.16	n.a.	n.a.
All other service workers	100	.16	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	40	.06	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations	45,860	73.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	3,500	5.64	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	620	1.00	11	25
First-line supervisors and manager/supervisors - production and operating workers	2,730	4.40	11	51
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	60	.10	19	7
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	90	.15	18	8
Precision inspectors, testers, and graders	740	1.19	8	6
Production inspectors, testers, graders, sorters, samplers, and weighers	2,510	4.04	13	26
Mechanics, installers, and repairers	6,060	9.76	n.a.	n.a.
Machinery maintenance mechanics	3,780	6.09	13	36
Millwrights	280	.45	9	7
Machinery maintenance workers	1,000	1.61	15	16
Maintenance repairers, general utility	440	.71	8	37
Automotive mechanics	50	.08	9	10
Heating, air conditioning, and refrigeration mechanics and installers	80	.13	12	6
Precision instrument repairers	230	.37	14	6
All other mechanics, installers, and repairers	200	.32	n.a.	n.a.
Construction trades workers, except material moving	950	1.53	n.a.	n.a.

See footnotes at end of table.

Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 21)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Carpenters	100	0.16	11	8
Electricians	540	.87	9	23
Plumbers, pipefitters, and steamfitters	250	.40	5	11
All other construction trades workers	60	.10	n.a.	n.a.
Precision metal workers	960	1.55	n.a.	n.a.
Machinists	660	1.06	7	16
Sheet- metal workers	190	.31	5	9
All other precision metal workers	110	.18	n.a.	n.a.
Precision food workers	630	1.02	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic	16,400	26.43	n.a.	n.a.
Cooking machine operators and tenders, food and tobacco	70	.11	19	6
Roasting, baking, and drying machine operators and tenders, food and tobacco	250	.40	17	19
Boiler operators and tenders, low pressure	150	.24	11	15
Cutting and slicing machine operators and tenders	340	.55	12	24
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	110	.18	21	7
Crushing, grinding, mixing, and blending machine operators and tenders	330	.53	16	21
Packaging and filling machine operators and tenders	6,680	10.76	10	33
All other machine setters and set-up operators, except metal and plastic	40	.06	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	8,430	13.58	n.a.	n.a.
Other hand workers, nec	280	.45	19	14
Motor vehicle operators	210	.34	n.a.	n.a.
Truck drivers, heavy or tractor trailer	210	.34	12	21
All other transportation and motor vehicle operators	190	.31	n.a.	n.a.
Material moving equipment operators	1,650	2.66	n.a.	n.a.
Industrial truck and tractor operators	1,590	2.56	14	34
Conveyor operators and tenders	60	.10	22	4
Helpers - mechanics and repairers	140	.23	17	7
Machine feeders and offbearers	430	.69	13	15
Freight, stock, and material movers, hand	1,500	2.42	13	22
Hand packers and packagers	320	.52	13	21
All other helpers, laborers, and material movers, hand	9,260	14.92	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations	130	.21	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Textile Mill Products

Establishments in this industry perform any of the following operations: (1) Preparing fiber and subsequently manufacturing yarn, thread, braid, twine, and cordage; (2) manufacturing broad woven fabric, narrow woven fabric, knit fabric, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacturing of knit apparel and other finished articles from yarn; and (6) the manufacturing of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles. These establishments employed 731,690 workers, accounting for 4 percent of manufacturing and 10 percent of nondurable goods employment in 1983. The three largest employers of these workers were: Knitting mills, with 27 percent of industry employment; cotton broad woven fabric mills, 17 percent; and yarn and thread mills, with 15 percent.

Total employment in the textile industry fell by almost 140,000, or 16 percent, between 1980 and 1983. Employment of service workers fell 28 percent, clerical workers 23 percent, and production workers, 15 percent. Even the more highly skilled occupational groups were not exempt from labor force reductions; employment of managerial and administrative workers declined 20 percent, and the number of professional and technical employees declined by 11 percent. As in other manufacturing industries, the number of sales workers increased despite the overall employment decline. Changes since 1977 are summarized in text table 3.

As shown in table 6, the 605,450 production and related workers in the textile mill products industry accounted for more than four-fifths of total industry employment. Clerical workers made up 8 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 3.5 percent; professional, paraprofessional, and technical workers, 3 percent; service workers, 2 percent; and sales workers, 1 percent.

The five most populous occupations in the manufacturing of textile mill products are listed in the tabulation below:

	Employment	*Percent of industry employment*
Textile machine operators and tenders, winding, twisting, weaving, knitting, etc.	191,100	26.1
Sewing machine operators, garment	51,730	7.1
Textile machine setters and setup operators	44,120	6.0
Production inspectors, testers, graders, sorters, samplers, and weighers	31,470	4.3
First-line supervisors, production	25,880	3.5

Text table 3. Textile mill products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	913,700	870,780	731,690	-19.9
Managerial and administrative workers	28,340	31,980	25,460	-10.2
Professional, paraprofessional, and technical workers	22,680	22,460	19,940	-12.1
Sales workers	7,550	7,040	[1]7,700	2.0
Clerical workers	73,380	76,760	58,940	-19.7
Production and related workers	764,090	713,410	605,450	-20.8
Service workers	17,660	19,110	13,780	-22.0

[1] Includes 1,270 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 22)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	731,600	100.00	—	—
Managerial and administrative occupations	25,450	3.48	n.a.	n.a.
Financial managers	1,560	.21	5	18
Personnel, training, and labor relations managers	1,530	.21	4	22
Purchasing managers	620	.08	4	11
Marketing, advertising, and public relations managers	1,110	.15	8	10
Administrative services managers	770	.11	11	9
Industrial production managers	4,610	.63	4	25
General managers and top executives	12,180	1.66	2	83
All other managers and administrators	3,070	.42	5	15
Professional, paraprofessional, and technical occupations	19,930	2.72	n.a.	n.a.
Management support workers	5,670	.78	n.a.	n.a.
Accountants, auditors, and other financial specialists	2,590	.35	n.a.	n.a.
Accountants and auditors	2,180	.30	5	23
Budget analysts	180	.02	12	2
All other financial specialists	230	.03	13	2
Purchasing agents, except wholesale and retail trade, and farm products	730	.10	5	11
Personnel, training, and labor relations specialists	840	.11	5	11
Cost estimators	460	.06	15	5
All other management support workers	1,050	.14	9	4
Engineers	3,740	.51	n.a.	n.a.
Chemical engineers	350	.05	12	3
Industrial engineers, except safety	2,090	.29	5	18
Safety engineers, except mining	140	.02	8	3
Mechanical engineers	890	.12	6	10
All other engineers	270	.04	13	2
Engineering and related technicians and technologists	2,060	.28	n.a.	n.a.
Industrial engineering technicians and technologists	1,300	.18	5	11
Mechanical engineering technicians and technologists	210	.03	16	2
Drafters	180	.02	8	3
All other engineering and related technicians and technologists	370	.05	13	2
Physical scientists	760	.10	n.a.	n.a.
Physical and life science technicians and technologists	2,760	.38	n.a.	n.a.
Chemical technicians and technologists, except health	2,480	.34	6	10
All other physical and life science technicians and technologists	280	.04	32	1
Computer scientists and related workers	2,240	.31	n.a.	n.a.
Systems analysts, electronic data processing	880	.12	11	6
Computer programmers	970	.13	8	8
All other computer systems analysts, programmers, and programmer aides	390	.05	n.a.	n.a.
Teachers and instructors, vocational education and training	490	.07	9	3
Health practitioners, technologists, technicians, and related health workers	640	.09	4	10
Designers, except interior designers	750	.10	10	6
All other professional, paraprofessional, and technical workers	820	.11	n.a.	n.a.
Sales and related occupations	7,700	1.05	n.a.	n.a.

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 22)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, sales and related workers	1,270	0.17	9	6
Sales representatives, scientific and related products and services, except retail	1,230	.17	13	6
Sales representatives, except scientific and related products or services and retail	4,480	.61	9	21
All other sales and related workers	720	.10	n.a.	n.a.
Clerical and administrative support occupations	58,950	8.06	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	2,920	.40	6	18
Secretaries	6,860	.94	3	54
Stenographers	230	.03	15	2
Receptionists and information clerks	720	.10	5	13
Typists	910	.12	8	7
Typists, word processing equipment	200	.03	17	2
Personnel clerks, except payroll and timekeeping	1,110	.15	4	17
File clerks	410	.06	10	4
Order clerks, materials, merchandise, and service	2,230	.30	8	12
Procurement clerks	560	.08	6	8
Statistical clerks	400	.05	11	3
Bookkeeping, accounting, and auditing clerks	4,390	.60	4	46
Payroll and timekeeping clerks	2,140	.29	4	24
Billing, cost and rate clerks	1,720	.24	6	14
General office clerks	8,230	1.12	4	46
Electronic data processing and other office machine operators	3,690	.50	n.a.	n.a.
Billing, posting, and calculating machine operators	570	.08	13	4
Computer operators, except peripheral equipment	1,050	.14	7	10
Peripheral EDP equipment operators	90	.01	19	1
Data entry keyers, except composing	1,820	.25	5	12
All other office machine operators	160	.02	25	1
Switchboard operators	790	.11	3	15
Material recording, scheduling, dispatching, and distributing workers	19,900	2.72	n.a.	n.a.
Production, planning, and expediting clerks	3,770	.52	5	21
Weighers, measurers, checkers, and samplers, recordkeeping	1,850	.25	7	9
Marking clerks	390	.05	17	2
Stock clerks, stockroom, warehouse or storage yard	4,140	.57	4	32
Traffic, shipping, and receiving clerks	8,490	1.16	3	55
All other material recording, scheduling, and distributing workers	1,260	.17	16	5
All other clerical and administrative support workers	1,540	.21	12	5
Service occupations	13,790	1.88	n.a.	n.a.
First-line supervisors and manager/supervisors, service	960	.13	11	5
Guards and watch guards	2,420	.33	4	14
Food and beverage preparation and service workers	150	.02	16	1
Cleaning and building service workers, except private households	8,930	1.22	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	6,990	.96	3	43
Elevator operators	320	.04	14	2
All other cleaning and building service workers, except private households	1,620	.22	15	4
All other service workers	1,330	.18	16	2

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 22)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Agriculture, forestry, fishing, and related occupations	400	0.05	n.a.	n.a.
Gardeners and groundskeepers, except farm	400	.05	7	5
Production, construction, operating, maintenance, and material handling occupations	605,380	82.75	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	29,870	4.08	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	1,720	.24	7	14
First-line supervisors and manager/supervisors - construction trades and extractive workers	520	.07	23	1
First-line supervisors and manager/supervisors - production and operating workers	25,880	3.54	3	64
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	710	.10	18	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,040	.14	10	6
Precision inspectors, testers, and graders	2,540	.35	9	7
Production inspectors, testers, graders, sorters, samplers, and weighers	31,470	4.30	3	44
Mechanics, installers, and repairers	45,780	6.26	n.a.	n.a.
Machinery maintenance mechanics	28,330	3.87	n.a.	n.a.
Machinery maintenance mechanics, textile machines	24,520	3.35	3	43
Machinery maintenance mechanics, sewing machines	1,970	.27	7	12
Machinery maintenance mechanics, water or power generation plant	320	.04	13	2
All other machinery maintenance mechanics	1,520	.21	10	5
Millwrights	1,100	.15	9	4
Machinery maintenance workers	2,420	.33	7	10
Maintenance repairers, general utility	8,050	1.10	4	35
Automotive mechanics	160	.02	11	2
Bus and truck mechanics and diesel engine specialists	150	.02	11	2
Heating, air conditioning, and refrigeration mechanics and installers	1,140	.16	5	9
Menders - garments, linens, and related	3,680	.50	11	5
All other mechanics, installers, and repairers	750	.10	24	2
Construction trades workers, except material moving	5,670	.78	n.a.	n.a.
Carpenters	1,030	.14	8	11
Electricians	3,530	.48	3	22
Painters and paperhangers, construction and maintenance	380	.05	7	5
Plumbers, pipefitters, and steamfitters	530	.07	6	6
All other construction trades workers	200	.03	14	2
Precision metal workers	1,750	.24	n.a.	n.a.
Machinists	1,420	.19	5	10
Tool grinders, filers, sharpeners, and other precision grinders	210	.03	19	1
All other precision metal workers	120	.02	46	1
Precision textile, apparel, and furnishings workers	6,830	.93	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers	820	.11	18	5
Custom tailors and sewers	160	.02	43	1

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 22)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Pressers, delicate fabrics	250	0.03	38	(3)
Precision dyers	1,770	.24	12	5
All other precision textile, apparel, and furnishings workers	3,830	.52	n.a.	n.a.
Precision workers, nec	280	.04	n.a.	n.a.
Precision detail design decorators, and painters	190	.03	22	1
All other precision workers, nec	90	.01	43	(3)
Machine setters, set-up operators, and tenders, metal and plastic	480	.07	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic	366,790	50.14	n.a.	n.a.
Specialty materials printing machine setters and set-up operators	1,000	.14	16	2
Screen printing machine setters and set-up operators	2,290	.31	9	5
All other printing related setters and set-up operators	680	.09	21	1
Printing press machine operators and tenders	1,340	.18	12	4
All other printing, binding, and related machine operators and tenders	760	.10	16	1
Textile machine setters and set-up operators	44,120	6.03	4	39
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	191,100	26.12	1	61
Extruding and forming machine operators and tenders, synthetic or glass fibers	3,460	.47	11	3
Textile draw-out machine operators and tenders	13,860	1.89	7	12
Textile bleaching and dyeing machine operators and tenders	21,260	2.91	5	22
Sewing machine operators, garment	51,730	7.07	3	19
Sewing machine operators, nongarment	8,430	1.15	9	13
Laundry and drycleaning machine operators and tenders, except pressing	500	.07	15	2
Pressing machine operators and tenders, textile, garment, and related materials	2,920	.40	13	6
Furnace, kiln, oven, drier, or kettle operators and tenders	1,420	.19	16	3
Boiler operators and tenders, low pressure	1,160	.16	6	7
Cutting and slicing machine setters and set-up operators	1,040	.14	11	5
Cutting and slicing machine operators and tenders	2,050	.28	12	5
Coating, painting, and spraying machine setters and set-up operators	740	.10	19	1
Coating, painting, and spraying machine operators and tenders	1,230	.17	12	2
Cementing and gluing machine operators and tenders	160	.02	22	1
Cleaning, washing, and pickling equipment operators and tenders	310	.04	19	1
Crushing, grinding, mixing, and blending machine operators and tenders	1,820	.25	8	6
Extruding, forming, pressing, and compacting machine setters and set-up operators	120	.02	20	(3)
Packaging and filling machine operators and tenders	3,510	.48	10	9
All other machine setters and set-up operators, except metal and plastic	820	.11	19	1
All other machine operators and tenders, except metal and plastic	8,960	1.22	n.a.	n.a.
Other hand workers, nec	16,970	2.32	n.a.	n.a.
Pressers, hand	1,100	.15	20	3

See footnotes at end of table.

Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 22)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sewers, hand	2,180	0.30	17	5
Cutters and trimmers, hand	1,770	.24	13	5
Portable machine cutters	2,000	.27	10	9
Carpet cutters, diagrammers, and seamers	610	.08	22	1
Assemblers and fabricators, except machine, electrical, electronic, and precision	1,590	.22	18	2
All other hand workers, nec	7,720	1.06	n.a.	n.a.
Plant and system workers	1,560	.21	n.a.	n.a.
Water and liquid waste treatment plant and system operators	350	.05	15	3
Stationary engineers	170	.02	12	1
All other plant and system operators	1,040	.14	30	1
Motor vehicle operators	2,790	.38	n.a.	n.a.
Truck drivers, heavy or tractor trailer	1,960	.27	8	10
Truck drivers, light, include delivery and route workers	720	.10	6	10
All other motor vehicle operators	110	.02	14	1
All other transportation and motor vehicle operators	80	.01	17	1
Material moving equipment operators	10,530	1.44	n.a.	n.a.
Industrial truck and tractor operators	9,530	1.30	4	26
Conveyor operators and tenders	510	.07	15	2
All other material moving equipment operators	490	.07	17	1
Helpers - mechanics and repairers	2,110	.29	12	5
Construction trades and extractive worker helpers	230	.03	15	1
Machine feeders and offbearers	16,640	2.27	5	18
Freight, stock, and material movers, hand	15,730	2.15	4	28
Hand packers and packagers	13,800	1.89	7	27
All other helpers, laborers, and material movers, hand	33,480	4.58	5	22

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Apparel and Other Textile Products

Establishments which manufacture apparel and textile house furnishings employed over 1.1 million workers, or 6 percent of manufacturing and 15 percent of nondurable goods employment in 1983. One-third of the industry's employees produced women's, misses', and juniors' outerwear; 28 percent produced men's and boys' furnishings, work clothing, and allied garments; and 15 percent manufactured miscellaneous fabricated textile products.

As shown in table 7, approximately 960,000 production and related workers were employed in the manufacture of apparel and other textile products, accounting for 84 percent of total industry employment. Clerical workers ranked second with 9 percent. Managerial and administrative workers accounted for 3 percent; professional, paraprofessional, and technical workers, 2 percent; sales workers, 2 percent; and service workers, 1 percent of total industry employment. Text table 4 shows the employment change by major group between 1977 and 1983.

The five most populous occupations in the industry are listed below. These production occupations accounted for more than half of total industry employment.

	Employment	*Percent of industry employment*
Sewing machine operators, garment	568,500	49.8
Sewing machine operators, nongarment	56,990	5.0
Production inspectors, testers, graders, sorters, samplers, and weighers	36,690	3.2
First-line supervisors, production	30,800	2.7
Pressing machine operators and tenders—textile, garment, etc.	30,560	2.7

Text table 4. Apparel and other textile products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,318,700	1,271,360	1,141,100	-13.5
Managerial and administrative workers	45,010	45,820	[1]35,430	-21.3
Professional, paraprofessional, and technical workers	15,530	17,750	17,400	12.0
Sales workers	18,570	18,420	19,100	2.9
Clerical workers	116,890	116,190	98,130	-16.0
Production and related workers	1,105,630	1,057,890	957,550	-13.4
Service workers	17,070	15,290	13,280	-22.2

[1] A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns.

See footnote 1 to text table 1.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 23)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,140,970	100.00	—	—
Managerial and administrative occupations	35,440	3.11	n.a.	n.a.
Financial managers	1,620	.14	6	9
Personnel, training, and labor relations managers	1,080	.09	4	8
Purchasing managers	700	.06	5	5
Marketing, advertising, and public relations managers	1,120	.10	8	5
Administrative services managers	820	.07	6	4
Industrial production managers	3,800	.33	4	16
General managers and top executives	24,290	2.13	2	75
All other managers and administrators	2,010	.18	6	6
Professional, paraprofessional, and technical occupations	17,400	1.53	n.a.	n.a.
Management support workers	5,730	.50	n.a.	n.a.
Accountants, auditors, and other financial specialists	1,750	.15	n.a.	n.a.
Accountants and auditors	1,220	.11	7	6
Budget analysts	160	.01	14	1
All other financial specialists	370	.03	34	1
Purchasing agents, except wholesale and retail trade, and farm products	930	.08	6	6
Personnel, training, and labor relations specialists	730	.06	12	4
Cost estimators	500	.04	6	3
All other management support workers	1,820	.16	36	2
Engineers	2,090	.18	n.a.	n.a.
Industrial engineers, except safety	1,600	.14	5	8
Mechanical engineers	270	.02	8	2
All other engineers	220	.02	n.a.	n.a.
Engineering and related technicians and technologists	950	.08	n.a.	n.a.
Industrial engineering technicians and technologists	640	.06	5	4
Drafters	130	.01	15	1
All other engineering and related technicians and technologists	180	.02	n.a.	n.a.
Computer scientists and related workers	1,940	.17	n.a.	n.a.
Systems analysts, electronic data processing	680	.06	27	2
Computer programmers	860	.08	7	4
All other computer systems analysts, programmers, and programmer aides	400	.04	n.a.	n.a.
Teachers and instructors, vocational education and training	700	.06	9	2
Designers, except interior designers	5,500	.48	5	15
All other professional, paraprofessional, and technical workers	490	.04	n.a.	n.a.
Sales and related occupations	19,090	1.67	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	1,400	.12	9	4
Sales representatives, scientific and related products and services, except retail	2,160	.19	9	5
Sales representatives, except scientific and related products or services and retail	12,030	1.05	4	17
All other sales and related workers	3,500	.31	n.a.	n.a.
Clerical and administrative support occupations	98,130	8.60	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	3,000	.26	3	13
Secretaries	8,790	.77	3	35

See footnotes at end of table.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 23)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Stenographers	190	0.02	9	1
Receptionists and information clerks	1,050	.09	4	7
Typists	860	.08	9	3
Typists, word processing equipment	240	.02	16	1
Personnel clerks, except payroll and timekeeping	790	.07	4	6
File clerks	690	.06	6	3
Order clerks, materials, merchandise, and service	2,780	.24	6	7
Procurement clerks	550	.05	7	3
Statistical clerks	180	.02	9	1
Bookkeeping, accounting, and auditing clerks	12,310	1.08	3	41
Payroll and timekeeping clerks	6,050	.53	2	31
Billing, cost and rate clerks	1,660	.15	6	6
General office clerks	14,390	1.26	3	37
Electronic data processing and other office machine operators	4,360	.38	n.a.	n.a.
Billing, posting, and calculating machine operators	730	.06	8	3
Computer operators, except peripheral equipment	1,350	.12	7	6
Peripheral EDP equipment operators	130	.01	14	1
Data entry keyers, except composing	1,990	.17	4	6
All other office machine operators	160	.01	11	1
Switchboard operators	790	.07	4	7
Material recording, scheduling, dispatching, and distributing workers	38,160	3.34	n.a.	n.a.
Production, planning, and expediting clerks	3,260	.29	5	9
Weighers, measurers, checkers, and samplers, recordkeeping	1,110	.10	11	2
Marking clerks	1,430	.13	7	4
Stock clerks, stockroom, warehouse or storage yard	7,990	.70	4	21
Traffic, shipping, and receiving clerks	22,790	2.00	4	44
All other material recording, scheduling, and distributing workers	1,580	.14	8	3
All other clerical and administrative support workers	1,290	.11	11	2
Service occupations	13,280	1.16	n.a.	n.a.
First-line supervisors and manager/supervisors, service	1,480	.13	6	3
Guards and watch guards	1,190	.10	6	4
Food and beverage preparation and service workers	160	.01	10	1
Cleaning and building service workers, except private households	9,930	.87	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	9,260	.81	2	37
All other cleaning and building service workers, except private households	670	.06	n.a.	n.a.
All other service workers	520	.05	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	120	.01	n.a.	n.a.
Gardeners and groundskeepers, except farm	120	.01	8	1
Production, construction, operating, maintenance, and material handling occupations	957,510	83.92	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	33,820	2.96	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	970	.09	5	6

See footnotes at end of table.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 23)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - construction trades and extractive workers	180	0.02	16	(3)
First-line supervisors and manager/supervisors - production and operating workers	30,800	2.70	2	59
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	410	.04	10	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,460	.13	7	3
Precision inspectors, testers, and graders	2,760	.24	7	3
Production inspectors, testers, graders, sorters, samplers, and weighers	36,690	3.22	2	37
Mechanics, installers, and repairers	17,730	1.55	n.a.	n.a.
Machinery maintenance mechanics	11,120	.97	n.a.	n.a.
Machinery maintenance mechanics, textile machines	1,080	.09	5	3
Machinery maintenance mechanics, sewing machines	9,600	.84	2	32
All other machinery maintenance mechanics	440	.04	n.a.	n.a.
Millwrights	260	.02	26	(3)
Machinery maintenance workers	330	.03	12	1
Maintenance repairers, general utility	2,630	.23	3	13
Menders - garments, linens, and related	2,260	.20	6	5
All other mechanics, installers, and repairers	1,130	.10	n.a.	n.a.
Construction trades workers, except material moving	1,010	.09	n.a.	n.a.
Carpenters	210	.02	9	1
Electricians	380	.03	15	1
Plumbers, pipefitters, and steamfitters	130	.01	22	(3)
All other construction trades workers	290	.03	n.a.	n.a.
Precision metal workers	710	.06	n.a.	n.a.
Machinists	220	.02	11	1
Tool grinders, filers, sharpeners, and other precision grinders	140	.01	42	(3)
All other precision metal workers	350	.03	19	(3)
Precision textile, apparel, and furnishings workers	27,070	2.37	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers	10,870	.95	4	24
Custom tailors and sewers	10,160	.89	9	7
Shoe and leather workers and repairers, precision	720	.06	30	(3)
Pressers, delicate fabrics	1,690	.15	10	1
Precision dyers	150	.01	25	(3)
All other precision textile, apparel, and furnishings workers	3,480	.31	11	2
Precision workers, nec	310	.03	n.a.	n.a.
Precision detail design decorators, and painters	180	.02	19	1
All other precision workers, nec	130	.01	23	(3)
Machine setters, set-up operators, and tenders, metal and plastic	1,280	.11	n.a.	n.a.
Plastic molding and casting machine operators and tenders	470	.04	24	(3)
All other machine setters and set-up operators, metal and plastic	810	.07	n.a.	n.a.
All other machine operators and tenders, metal and plastic	680	.06	26	(3)
Machine setters, set-up operators, and tenders, except metal and plastic	683,750	59.93	n.a.	n.a.
Specialty materials printing machine setters and set-up operators	550	.05	14	1
Screen printing machine setters and set-up operators	1,810	.16	11	2

See footnotes at end of table.

Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 23)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other printing related setters and set-up operators	340	0.03	22	1
Printing press machine operators and tenders	600	.05	14	1
All other printing, binding, and related machine operators and tenders	370	.03	25	(*)
Textile machine setters and set-up operators	1,200	.11	13	2
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	8,400	.74	7	7
Extruding and forming machine operators and tenders, synthetic or glass fibers	320	.03	38	(*)
Textile draw-out machine operators and tenders	150	.01	26	(*)
Textile bleaching and dyeing machine operators and tenders	770	.07	36	(*)
Sewing machine operators, garment	568,500	49.83	1	69
Sewing machine operators, nongarment	56,990	4.99	3	21
Shoe sewing machine operators and tenders	460	.04	40	(*)
Laundry and drycleaning machine operators and tenders, except pressing	680	.06	16	1
Pressing machine operators and tenders, textile, garment, and related materials	30,560	2.68	2	27
Cutting and slicing machine setters and set-up operators	2,360	.21	7	5
Cutting and slicing machine operators and tenders	2,300	.20	7	4
Coating, painting, and spraying machine setters and set-up operators	120	.01	21	(*)
Coating, painting, and spraying machine operators and tenders	210	.02	28	(*)
Cementing and gluing machine operators and tenders	630	.06	13	1
Packaging and filling machine operators and tenders	1,810	.16	10	2
All other machine setters and set-up operators, except metal and plastic	1,280	.11	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	2,660	.23	n.a.	n.a.
Other hand workers, nec	78,140	6.85	n.a.	n.a.
Pressers, hand	14,570	1.28	3	20
Sewers, hand	8,680	.76	7	10
Cutters and trimmers, hand	22,570	1.98	3	28
Portable machine cutters	14,960	1.31	3	26
Painting, coating, and decorating, workers, hand	140	.01	23	(*)
Assemblers and fabricators, except machine, electrical, electronic, and precision	6,980	.61	11	4
All other hand workers, nec	10,240	.90	n.a.	n.a.
Plant and system workers	610	.05	n.a.	n.a.
Motor vehicle operators	1,340	.12	n.a.	n.a.
Truck drivers, light, include delivery and route workers	1,340	.12	6	7
All other transportation and motor vehicle operators	1,140	.10	n.a.	n.a.
Material moving equipment operators	2,230	.20	n.a.	n.a.
Industrial truck and tractor operators	1,670	.15	9	3
Conveyor operators and tenders	280	.02	12	1
All other material moving equipment operators	280	.02	16	(*)
Helpers - mechanics and repairers	460	.04	9	2
Machine feeders and offbearers	3,700	.32	6	5
Freight, stock, and material movers, hand	19,730	1.73	3	24
Hand packers and packagers	19,430	1.70	3	23
All other helpers, laborers, and material movers, hand	25,600	2.24	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

(*) Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Lumber and Wood Products, Except Furniture

Establishments in this industry include logging camps, sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, plywood and veneer mills, and establishments manufacturing certain finished articles made entirely or mainly of wood or wood substitutes. These establishments employed 645,130 workers, or only 4 percent of manufacturing and 6 percent of durable goods employment in 1983. Sawmills and planing mills accounted for 30 percent of industry employment; establishments manufacturing fabricated millwork, veneer, plywood, and structural wood members, 30 percent; and logging camps and logging contractors, 12 percent. Text table 5 shows employment since 1977 for the major occupational groups in the lumber and wood products industry.

The 469,820 production and related workers in the lumber and wood products industry accounted for almost three-quarters of total industry employment (table 8). Clerical workers and managerial and administrative workers accounted for 7 and 5 percent, respectively. Agriculture, forestry, fishing, and related workers accounted for 10 percent. Each of the following groups accounted for 2 percent of industry employment: Professional, paraprofessional, and technical workers; sales workers; and service workers.

The five most populous occupations in the industry are listed in the tabulation below:

	Employment	*Percent of industry employment*
Machine feeders and offbearers	47,530	7.4
Sawing machine operators and tenders	32,690	5.1
Assemblers and fabricators, except machine, electrical, electronic, and precision	32,370	5.0
Truckdrivers, heavy or tractor trailer	27,040	4.2
Cabinetmakers and bench carpenters	25,410	3.9

Text table 5. Lumber and wood products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	714,360	657,270	645,130	-9.7
Managerial and administrative workers	34,630	41,070	30,240	-12.7
Professional, paraprofessional, and technical workers	17,060	14,980	13,360	-21.7
Sales workers	9,670	11,060	[1]12,270	26.9
Clerical workers	42,560	41,920	42,540	-0.1
Production and related workers	597,170	534,720	[2]536,060	-10.2
Service workers	13,270	13,520	10,660	-19.7

[1] Includes 915 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

[2] Includes 66,240 agriculture, forestry, and fishing workers who would have been classified as production and related workers in previous surveys.

Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 24)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	645,130	100.00	—	—
Managerial and administrative occupations	30,230	4.69	n.a.	n.a.
Financial managers	1,060	.16	4	4
Personnel, training, and labor relations managers	720	.11	4	3
Purchasing managers	700	.11	4	4
Marketing, advertising, and public relations managers	950	.15	5	3
Administrative services managers	460	.07	7	2
Industrial production managers	2,460	.38	4	6
General managers and top executives	22,340	3.46	1	64
All other managers and administrators	1,540	.24	9	3
Professional, paraprofessional, and technical occupations	13,360	2.07	n.a.	n.a.
Management support workers	6,380	.99	n.a.	n.a.
Accountants, auditors, and other financial specialists	3,560	.55	n.a.	n.a.
Accountants and auditors	3,330	.52	3	13
Budget analysts	70	.01	12	[3]
All other financial specialists	160	.02	15	[3]
Purchasing agents, except wholesale and retail trade, and farm products	1,180	.18	4	5
Personnel, training, and labor relations specialists	350	.05	8	1
Cost estimators	540	.08	6	2
All other management support workers	750	.12	23	1
Engineers	1,560	.24	n.a.	n.a.
Industrial engineers, except safety	570	.09	14	2
Mechanical engineers	470	.07	9	2
All other engineers	520	.08	n.a.	n.a.
Engineering and related technicians and technologists	2,060	.32	n.a.	n.a.
Industrial engineering technicians and technologists	140	.02	11	[3]
Drafters	1,620	.25	5	4
Surveying and mapping technicians and technologists	80	.01	19	[3]
All other engineering and related technicians and technologists	220	.03	n.a.	n.a.
Life scientists	850	.13	n.a.	n.a.
Foresters and conservation scientists	760	.12	8	1
All other life scientists	90	.01	n.a.	n.a.
Physical and life science technicians and technologists	410	.06	n.a.	n.a.
Computer scientists and related workers	1,280	.20	n.a.	n.a.
Systems analysts, electronic data processing	400	.06	17	1
Computer programmers	590	.09	14	1
Computer programmer aides	290	.04	20	1
Health practitioners, technologists, technicians, and related health workers	80	.01	9	[3]
Designers, except interior designers	150	.02	16	[3]
All other professional, paraprofessional, and technical workers	590	.09	n.a.	n.a.
Sales and related occupations	12,270	1.90	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	920	.14	6	2
Sales representatives, scientific and related products and services, except retail	2,440	.38	4	6
Sales representatives, except scientific and related products or services and retail	7,960	1.23	2	18

See footnotes at end of table.

Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 24)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other sales and related workers	950	0.15	16	2
Clerical and administrative support occupations	42,550	6.60	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,050	.16	6	3
Secretaries	10,460	1.62	2	36
Stenographers	70	.01	19	(*)
Receptionists and information clerks	460	.07	4	2
Typists	210	.03	9	1
Typists, word processing equipment	200	.03	20	(*)
Personnel clerks, except payroll and timekeeping	400	.06	5	2
File clerks	260	.04	11	1
Order clerks, materials, merchandise, and service	650	.10	6	2
Procurement clerks	270	.04	5	1
Bookkeeping, accounting, and auditing clerks	9,340	1.45	2	36
Payroll and timekeeping clerks	660	.10	3	4
Billing, cost and rate clerks	660	.10	4	2
General office clerks	7,620	1.18	2	25
Electronic data processing and other office machine operators	1,140	.18	n.a.	n.a.
Billing, posting, and calculating machine operators	130	.02	10	(*)
Computer operators, except peripheral equipment	330	.05	6	1
Data entry keyers, except composing	570	.09	5	2
All other office machine operators	110	.02	26	(*)
Switchboard operators	420	.07	4	2
Material recording, scheduling, dispatching, and distributing workers	8,270	1.28	n.a.	n.a.
Production, planning, and expediting clerks	900	.14	5	2
Weighers, measurers, checkers, and samplers, recordkeeping	670	.10	6	1
Stock clerks, stockroom, warehouse or storage yard	1,140	.18	5	3
Traffic, shipping, and receiving clerks	5,310	.82	2	13
All other material recording, scheduling, and distributing workers	250	.04	13	1
All other clerical and administrative support workers	410	.06	26	1
Service occupations	10,670	1.65	n.a.	n.a.
First-line supervisors and manager/supervisors, service	320	.05	12	1
Guards and watch guards	4,200	.65	2	9
Food and beverage preparation and service workers	140	.02	13	(*)
Cleaning and building service workers, except private households	5,870	.91	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	5,640	.87	2	18
All other cleaning and building service workers, except private households	230	.04	9	1
All other service workers	140	.02	14	(*)
Agriculture, forestry, fishing, and related occupations	66,240	10.27	n.a.	n.a.
First line supervisors-agricultural, forestry, fishing, and related workers	4,260	.66	3	10
Fallers and buckers	18,270	2.83	2	22
Choke setters	5,480	.85	3	6
Log handling equipment operators	10,970	1.70	2	23
Logging tractor operators	18,920	2.93	2	25
All other timber cutting and related logging workers	2,380	.37	6	3

See footnotes at end of table.

Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 24)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Forest and conservation workers	1,530	0.24	8	1
Nursery workers	250	.04	18	[3]
Log graders and scalers	3,700	.57	3	12
Gardeners and groundskeepers, except farm	200	.03	16	[3]
All other agriculture, forestry, fishing, and related workers	280	.04	21	[3]
Production, construction, operating, maintenance, and material handling occupations	469,810	72.82	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	23,960	3.71	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	1,190	.18	4	3
First-line supervisors and manager/supervisors - construction trades and extractive workers	420	.07	11	1
First-line supervisors and manager/supervisors - production and operating workers	20,860	3.23	1	40
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	580	.09	5	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	910	.14	8	2
Precision inspectors, testers, and graders	440	.07	10	1
Production inspectors, testers, graders, sorters, samplers, and weighers	13,150	2.04	2	17
Mechanics, installers, and repairers	31,700	4.91	n.a.	n.a.
Machinery maintenance mechanics	6,220	.96	3	12
Millwrights	2,410	.37	6	2
Machinery maintenance workers	3,140	.49	3	9
Maintenance repairers, general utility	11,760	1.82	2	25
Automotive mechanics	970	.15	5	3
Bus and truck mechanics and diesel engine specialists	910	.14	5	2
Mobile heavy equipment mechanics, except engines	1,920	.30	5	4
Installers and repairers, manufactured buildings, mobile homes, and travel trailers	3,580	.55	12	1
All other mechanics, installers, and repairers	790	.12	8	1
Construction trades workers, except material moving	29,010	4.50	n.a.	n.a.
Carpenters	21,390	3.32	3	11
Electricians	3,420	.53	3	5
Painters and paperhangers, construction and maintenance	530	.08	12	1
Plumbers, pipefitters, and steamfitters	1,140	.18	6	2
All other construction trades workers	2,530	.39	13	1
Precision metal workers	3,140	.49	n.a.	n.a.
Tool-and-die makers	80	.01	17	[3]
Machinists	700	.11	5	2
Tool grinders, filers, sharpeners, and other precision grinders	1,870	.29	4	4
Sheet- metal workers	380	.06	18	[3]
All other precision metal workers	110	.02	23	[3]
Precision woodworkers	44,830	6.95	n.a.	n.a.
Pattern and model makers, wood	350	.05	17	1
Pattern markers, wood	230	.04	15	[3]
Wood machinists	16,660	2.58	3	14
Cabinetmakers and bench carpenters	25,410	3.94	3	15
Furniture finishers	740	.11	11	1
All other precision woodworkers	1,440	.22	17	1

See footnotes at end of table.

Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 24)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Precision workers, nec	740	0.11	n.a.	n.a.
Precision detail design decorators, and painters	90	.01	25	(3)
All other precision workers, nec	650	.10	26	(3)
Machine setters, set-up operators, and tenders, metal and plastic	2,450	.38	n.a.	n.a.
Drilling and boring machine tool setters and set-up operators, metal and plastic	170	.03	14	(3)
Machine tool cutting operators and tenders, metal and plastic	700	.11	14	(3)
Punching machine setters and set-up operators, metal and plastic	140	.02	17	(3)
Press and press brake machine setters and set-up operators, metal and plastic	80	.01	18	(3)
Machine forming operators and tenders, metal and plastic	540	.08	18	(3)
Combination machine tool operators and tenders, metal and plastic	120	.02	23	(3)
Welding machine setters and set-up operators	320	.05	16	(3)
Welding machine operators and tenders	200	.03	14	(3)
All other machine setters and set-up operators, metal and plastic	180	.03	n.a.	n.a.
All other machine operators and tenders, metal and plastic	390	.06	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic	114,620	17.77	n.a.	n.a.
Sawing machine setters and set-up operators	6,500	1.01	3	13
Head sawyers	6,180	.96	2	20
Sawing machine operators and tenders	32,690	5.07	1	34
Woodworking machine setters and set-up operators, except sawing	12,090	1.87	3	16
Woodworking machine operators and tenders, except sawing	22,340	3.46	2	18
Sewing machine operators, nongarment	300	.05	30	(3)
Furnace, kiln, oven, drier, or kettle operators and tenders	4,080	.63	3	8
Boiler operators and tenders, low pressure	2,020	.31	4	3
Cutting and slicing machine setters and set-up operators	170	.03	16	(3)
Cutting and slicing machine operators and tenders	920	.14	7	2
Coating, painting, and spraying machine setters and set-up operators	2,460	.38	5	5
Coating, painting, and spraying machine operators and tenders	5,370	.83	4	7
Cementing and gluing machine operators and tenders	7,850	1.22	4	6
Crushing, grinding, mixing, and blending machine operators and tenders	850	.13	6	2
Extruding, forming, pressing, and compacting machine setters and set-up operators	430	.07	19	(3)
Extruding, forming, pressing, and compacting machine operators and tenders	1,600	.25	12	1
Packaging and filling machine operators and tenders	2,200	.34	5	3
All other machine setters and set-up operators, except metal and plastic	780	.12	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	5,400	.84	n.a.	n.a.
Other hand workers, nec	39,690	6.15	n.a.	n.a.
Glaziers, manufacturing	880	.14	13	1
Welders and cutters	1,010	.16	6	2
Cutters and trimmers, hand	190	.03	16	(3)
Carpet cutters, diagrammers, and seamers	210	.03	12	(3)

See footnotes at end of table.

Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 24)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Painting, coating, and decorating, workers, hand	930	0.14	11	1
Grinding and polishing workers, hand	1,940	.30	8	1
Assemblers and fabricators, except machine, electrical, electronic, and precision	32,370	5.02	4	8
All other hand workers, nec	2,160	.33	n.a.	n.a.
Plant and system workers	420	.07	22	[3]
Motor vehicle operators	28,320	4.39	n.a.	n.a.
Truck drivers, heavy or tractor trailer	27,040	4.19	1	48
Truck drivers, light, include delivery and route workers	1,000	.16	7	2
All other motor vehicle operators	280	.04	15	[3]
All other transportation and motor vehicle operators	230	.04	14	[3]
Material moving equipment operators	27,970	4.34	n.a.	n.a.
Grader, dozer, and scraper operators	740	.11	7	1
Hoist and winch operators	2,370	.37	4	4
Industrial truck and tractor operators	20,940	3.25	1	31
Conveyor operators and tenders	1,400	.22	7	1
Pump operators	430	.07	37	[3]
Operating engineers	370	.06	11	1
All other material moving equipment operators	1,720	.27	6	2
Helpers - mechanics and repairers	660	.10	7	1
Construction trades and extractive worker helpers	5,300	.82	6	4
Machine feeders and offbearers	47,530	7.37	2	25
Freight, stock, and material movers, hand	16,550	2.57	3	17
Hand packers and packagers	8,850	1.37	3	10
All other helpers, laborers, and material movers, hand	30,140	4.67	3	9
All other production, construction, operating, maintenance, and material handling occupations	110	.02	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Furniture and Fixtures

Establishments which manufacture household, office, public building, and restaurant furniture, and office and store fixtures employed 439,250 workers in 1983, accounting for 2 percent of manufacturing and 4 percent of durable goods employment. Establishments manufacturing household furniture employed 63 percent of the industry's workers; those manufacturing partitions, shelving, lockers, and office and store fixtures, 13 percent; and those manufacturing office furniture, 12 percent. Employment since 1977 by occupational group is given in text table 6.

As shown in table 9, the 350,090 production and related workers accounted for more than three-fourths of total industry employment. Clerical workers ranked second with 9 percent. Managerial and administrative workers accounted for 4 percent; sales workers, 3 percent; professional, paraprofessional, and technical workers, 3 percent; and service workers, 1 percent of total industry employment.

The five most populous occupations in the manufacturing of furniture and fixtures are listed below:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	56,680	12.9
Upholsterers	22,450	5.1
Sewing machine operators, nongarment	19,300	4.4
Cabinetmakers and bench carpenters	19,150	4.4
First-line supervisors, production	16,980	3.9

Text table 6. Furniture and fixtures: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	462,660	455,830	439,250	-5.1
Managerial and administrative workers	19,500	24,300	19,690	1.0
Professional, paraprofessional, and technical workers	12,200	13,810	11,090	-9.1
Sales workers	10,060	10,470	[1]12,430	23.6
Clerical workers	43,190	50,490	39,600	-8.3
Production and related workers	369,780	348,250	350,090	-5.3
Service workers	7,930	8,510	6,230	-21.4

[1] Includes 906 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 25)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	439,230	100.00	--	--
Managerial and administrative occupations	19,700	4.49	n.a.	n.a.
Financial managers	1,060	.24	4	12
Personnel, training, and labor relations managers	690	.16	4	10
Purchasing managers	640	.15	4	10
Marketing, advertising, and public relations managers	1,150	.26	5	9
Administrative services managers	410	.09	7	5
Industrial production managers	1,750	.40	5	13
General managers and top executives	12,540	2.85	2	82
All other managers and administrators	1,460	.33	9	7
Professional, paraprofessional, and technical occupations	11,080	2.52	n.a.	n.a.
Management support workers	4,110	.94	n.a.	n.a.
Accountants, auditors, and other financial specialists	1,890	.43	n.a.	n.a.
Accountants and auditors	1,670	.38	4	19
Budget analysts	60	.01	12	1
All other financial specialists	160	.04	10	2
Purchasing agents, except wholesale and retail trade, and farm products	980	.22	3	13
Personnel, training, and labor relations specialists	380	.09	8	4
Cost estimators	460	.10	5	6
All other management support workers	400	.09	12	2
Engineers	2,120	.48	n.a.	n.a.
Industrial engineers, except safety	1,120	.25	7	8
Safety engineers, except mining	70	.02	10	1
Mechanical engineers	590	.13	6	5
All other engineers	340	.08	12	2
Engineering and related technicians and technologists	2,510	.57	n.a.	n.a.
Industrial engineering technicians and technologists	330	.08	8	3
Mechanical engineering technicians and technologists	80	.02	16	1
Drafters	1,870	.43	4	12
All other engineering and related technicians and technologists	230	.05	n.a.	n.a.
Computer scientists and related workers	1,250	.28	n.a.	n.a.
Systems analysts, electronic data processing	440	.10	9	4
Computer programmers	580	.13	7	6
Computer programmer aides	230	.05	8	3
Health practitioners, technologists, technicians, and related health workers	180	.04	9	2
Designers, except interior designers	570	.13	12	4
Interior designers	110	.03	15	1
All other professional, paraprofessional, and technical workers	230	.05	n.a.	n.a.
Sales and related occupations	12,440	2.83	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	910	.21	14	5
Sales representatives, scientific and related products and services, except retail	2,300	.52	8	10
Sales representatives, except scientific and related products or services and retail	8,250	1.88	4	29
All other sales and related workers	980	.22	12	3

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 25)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Clerical and administrative support occupations	39,590	9.01	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,080	.25	8	8
Secretaries	6,180	1.41	2	52
Stenographers	290	.07	22	2
Receptionists and information clerks	480	.11	5	7
Typists	530	.12	9	4
Typists, word processing equipment	100	.02	13	1
Personnel clerks, except payroll and timekeeping	490	.11	5	7
File clerks	300	.07	6	4
Order clerks, materials, merchandise, and service	1,750	.40	6	9
Procurement clerks	470	.11	5	6
Bookkeeping, accounting, and auditing clerks	4,920	1.12	2	49
Payroll and timekeeping clerks	980	.22	3	11
Billing, cost and rate clerks	910	.21	5	8
General office clerks	6,340	1.44	4	39
Electronic data processing and other office machine operators	1,870	.43	n.a.	n.a.
Billing, posting, and calculating machine operators	120	.03	12	2
Computer operators, except peripheral equipment	690	.16	6	6
Data entry keyers, except composing	980	.22	6	7
All other office machine operators	80	.02	18	1
Switchboard operators	560	.13	4	9
Material recording, scheduling, dispatching, and distributing workers	11,960	2.72	n.a.	n.a.
Production, planning, and expediting clerks	2,190	.50	10	10
Weighers, measurers, checkers, and samplers, recordkeeping	160	.04	12	1
Stock clerks, stockroom, warehouse or storage yard	1,930	.44	8	9
Traffic, shipping, and receiving clerks	7,330	1.67	4	45
All other material recording, scheduling, and distributing workers	350	.08	13	2
All other clerical and administrative support workers	380	.09	14	2
Service occupations	6,230	1.42	n.a.	n.a.
First-line supervisors and manager/supervisors, service	200	.05	20	1
Guards and watch guards	1,530	.35	6	6
Food and beverage preparation and service workers	130	.03	19	1
Cleaning and building service workers, except private households	4,290	.98	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	4,120	.94	3	34
All other cleaning and building service workers, except private households	170	.04	12	1
All other service workers	80	.02	23	([3])
Agriculture, forestry, fishing, and related occupations	120	.03	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations	350,070	79.70	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	19,040	4.33	n.a.	n.a.

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 25)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - mechanics, installers and repairers	850	0.19	15	5
First-line supervisors and manager/supervisors - construction trades and extractive workers	140	.03	32	(*)
First-line supervisors and manager/supervisors - production and operating workers	16,980	3.87	2	65
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	340	.08	7	4
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	730	.17	10	3
Precision inspectors, testers, and graders	530	.12	14	2
Production inspectors, testers, graders, sorters, samplers, and weighers	6,070	1.38	4	21
Mechanics, installers, and repairers	7,510	1.71	n.a.	n.a.
Machinery maintenance mechanics	1,430	.33	7	6
Millwrights	210	.05	20	1
Machinery maintenance workers	400	.09	10	3
Maintenance repairers, general utility	4,660	1.06	3	32
Automotive mechanics	120	.03	13	1
Bus and truck mechanics and diesel engine specialists	220	.05	17	1
All other mechanics, installers, and repairers	470	.11	n.a.	n.a.
Construction trades workers, except material moving	3,700	.84	n.a.	n.a.
Carpenters	2,560	.58	7	9
Electricians	660	.15	8	5
Painters and paperhangers, construction and maintenance	200	.05	18	1
Plumbers, pipefitters, and steamfitters	130	.03	15	1
All other construction trades workers	150	.03	39	1
Precision metal workers	4,250	.97	n.a.	n.a.
Tool-and-die makers	1,270	.29	12	5
Machinists	750	.17	8	3
Tool grinders, filers, sharpeners, and other precision grinders	440	.10	20	3
Sheet- metal workers	1,650	.38	19	2
All other precision metal workers	140	.03	25	1
Precision woodworkers	45,570	10.37	n.a.	n.a.
Pattern and model makers, wood	590	.13	9	3
Pattern markers, wood	490	.11	13	3
Wood machinists	14,690	3.34	7	25
Cabinetmakers and bench carpenters	19,140	4.36	3	34
Furniture finishers	8,680	1.98	7	7
All other precision woodworkers	1,980	.45	17	2
Precision textile, apparel, and furnishings workers	25,720	5.86	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers	1,380	.31	11	3
Upholsterers	22,450	5.11	4	25
All other precision textile, apparel, and furnishings workers	1,890	.43	16	1
Precision workers, nec	650	.15	n.a.	n.a.
Precision detail design decorators, and painters	190	.04	21	1
All other precision workers, nec	460	.10	20	1
Machine setters, set-up operators, and tenders, metal and plastic	24,030	5.47	n.a.	n.a.
Drilling and boring machine tool setters and set-up operators, metal and plastic	1,080	.25	13	2
Machine tool cutting operators and tenders, metal and plastic	1,490	.34	11	2

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 25)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Punching machine setters and set-up operators, metal and plastic	3,080	0.70	11	11
Press and press brake machine setters and set-up operators, metal and plastic	3,720	.85	8	11
Shear and slitter machine setters and set-up operators, metal and plastic	660	.15	8	3
Machine forming operators and tenders, metal and plastic	7,410	1.69	5	13
Numerical control machine tool operators and tenders, metal and plastic	160	.04	11	1
Combination machine tool setters and set-up operators, metal and plastic	550	.13	19	1
Combination machine tool operators and tenders, metal and plastic	460	.10	17	1
Welding machine setters and set-up operators	2,220	.51	12	4
Welding machine operators and tenders	2,320	.53	13	2
Soldering and brazing machine setters and set-up operators	280	.06	12	1
Soldering and brazing machine operators and tenders	210	.05	15	1
All other machine setters and set-up operators, metal and plastic	390	.09	19	1
All other machine operators and tenders, metal and plastic	880	.20	19	1
Machine setters, set-up operators, and tenders, except metal and plastic	79,220	18.04	n.a.	n.a.
Sawing machine setters and set-up operators	1,610	.37	10	5
Head sawyers	280	.06	28	1
Sawing machine operators and tenders	11,840	2.70	4	26
Woodworking machine setters and set-up operators, except sawing	7,860	1.79	6	17
Woodworking machine operators and tenders, except sawing	14,070	3.20	5	20
Textile machine setters and set-up operators	230	.05	23	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	1,590	.36	9	6
Sewing machine operators, nongarment	19,300	4.39	4	29
Furnace, kiln, oven, drier, or kettle operators and tenders	320	.07	13	2
Boiler operators and tenders, low pressure	580	.13	9	3
Cutting and slicing machine setters and set-up operators	210	.05	37	1
Cutting and slicing machine operators and tenders	430	.10	19	1
Coating, painting, and spraying machine setters and set-up operators	3,870	.88	7	17
Coating, painting, and spraying machine operators and tenders	6,400	1.46	5	22
Cementing and gluing machine operators and tenders	3,110	.71	6	15
Crushing, grinding, mixing, and blending machine operators and tenders	130	.03	19	1
Extruding, forming, pressing, and compacting machine setters and set-up operators	110	.03	31	(3)
Extruding, forming, pressing, and compacting machine operators and tenders	480	.11	22	1
Packaging and filling machine operators and tenders	3,640	.83	5	13
All other machine setters and set-up operators, except metal and plastic	400	.09	25	1
All other machine operators and tenders, except metal and plastic	1,880	.43	14	2
Other hand workers, nec	82,110	18.69	n.a.	n.a.

See footnotes at end of table.

Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 25)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Glaziers, manufacturing	260	0.06	19	1
Welders and cutters	2,830	.64	7	5
Solderers and brazers	160	.04	27	1
Cutters and trimmers, hand	4,950	1.13	5	17
Painting, coating, and decorating, workers, hand	4,390	1.00	9	9
Grinding and polishing workers, hand	6,800	1.55	7	12
Assemblers and fabricators, except machine, electrical, electronic, and precision	56,680	12.90	3	51
All other hand workers, nec	6,040	1.38	n.a.	n.a.
Plant and system workers	50	.01	19	1
Motor vehicle operators	7,330	1.67	n.a.	n.a.
Truck drivers, heavy or tractor trailer	6,150	1.40	4	30
Truck drivers, light, include delivery and route workers	1,070	.24	9	8
All other motor vehicle operators	110	.03	16	1
All other transportation and motor vehicle operators	190	.04	19	1
Material moving equipment operators	5,540	1.26	n.a.	n.a.
Hoist and winch operators	100	.02	19	1
Industrial truck and tractor operators	4,710	1.07	6	19
Conveyor operators and tenders	280	.06	18	1
All other material moving equipment operators	450	.10	n.a.	n.a.
Helpers - mechanics and repairers	480	.11	11	2
Construction trades and extractive worker helpers	210	.05	17	1
Machine feeders and offbearers	7,080	1.61	8	11
Freight, stock, and material movers, hand	10,240	2.33	4	28
Hand packers and packagers	6,860	1.56	8	10
All other helpers, laborers, and material movers, hand	13,690	3.12	7	10

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Paper and Allied Products

Establishments which manufacture paper and allied products employed 653,480 workers, accounting for nearly 4 percent of manufacturing and 9 percent of nondurable goods employment in 1983. Establishments manufacturing paper and paperboard into converted products (except containers and boxes) employed nearly one-third of the industry's workers; those producing paperboard containers and boxes, 29 percent; and paper mills (except building paper mills), 26 percent.

The industry's 484,860 production and related workers accounted for nearly three-fourths of total industry employment (table 10). Clerical workers ranked second with 10 percent.

Professional, paraprofessional, and technical workers constituted 6 percent; managerial and administrative workers, 5 percent; sales workers, over 3 percent; and service workers, just under 1.5 percent. Total employment in this industry declined 6 percent between 1980 and 1983, as shown in text table 7.

The following tabulation lists the five most populous occupations in the manufacturing of paper and allied products:

	Employment	*Percent of industry employment*
Paper goods machine setters and setup operators	54,820	8.4
First-line supervisors, production	27,380	4.2
Machine feeders and offbearers	24,890	3.8
Hand packers and packagers	21,100	3.2
Industrial truck and tractor operators	20,920	3.2

Text table 7. Paper and allied products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	686,140	698,910	653,480	-4.8
Managerial and administrative workers	33,000	37,340	31,480	-4.6
Professional, paraprofessional, and technical workers	28,660	40,690	41,250	43.9
Sales workers	15,480	16,540	[1]20,450	32.1
Clerical workers	65,730	73,240	63,120	-4.0
Production and related workers	531,640	519,530	484,860	-8.8
Service workers	11,630	11,570	9,350	-19.6

[1] Includes 1,850 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 26)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	653,490	100.00	—	—
Managerial and administrative occupations	31,500	4.82	n.a.	n.a.
Financial managers	2,180	.33	5	26
Personnel, training, and labor relations managers	1,750	.27	7	23
Purchasing managers	910	.14	4	15
Marketing, advertising, and public relations managers	2,520	.39	6	19
Administrative services managers	960	.15	8	10
Industrial production managers	4,880	.75	4	30
General managers and top executives	13,800	2.11	3	88
All other managers and administrators	4,500	.69	6	15
Professional, paraprofessional, and technical occupations	41,230	6.31	n.a.	n.a.
Management support workers	12,110	1.85	n.a.	n.a.
Accountants, auditors, and other financial specialists	5,030	.77	n.a.	n.a.
Accountants and auditors	4,180	.64	6	36
Budget analysts	330	.05	13	4
All other financial specialists	520	.08	17	3
Purchasing agents, except wholesale and retail trade, and farm products	2,540	.39	4	31
Personnel, training, and labor relations specialists	1,360	.21	8	12
Cost estimators	980	.15	4	13
All other management support workers	2,200	.34	19	7
Engineers	9,180	1.40	n.a.	n.a.
Chemical engineers	1,870	.29	8	8
Industrial engineers, except safety	1,420	.22	6	12
Mechanical engineers	2,130	.33	5	13
All other engineers	3,760	.58	n.a.	n.a.
Engineering and related technicians and technologists	3,710	.57	n.a.	n.a.
Electrical and electronic engineering technicians and technologists	710	.11	16	4
Industrial engineering technicians and technologists	220	.03	19	2
Mechanical engineering technicians and technologists	280	.04	10	2
Drafters	920	.14	13	8
All other engineering and related technicians and technologists	1,580	.24	18	3
Physical scientists	2,190	.34	n.a.	n.a.
Chemists, except biochemists	1,890	.29	19	6
All other physical scientists	300	.05	22	2
Life scientists	170	.03	30	1
Physical and life science technicians and technologists	4,130	.63	n.a.	n.a.
Chemical technicians and technologists, except health	2,950	.45	17	6
All other physical and life science technicians and technologists	1,180	.18	32	1
Computer scientists and related workers	2,550	.39	n.a.	n.a.
Systems analysts, electronic data processing	1,130	.17	13	8
Computer programmers	980	.15	6	9
Computer programmer aides	440	.07	7	5
Health practitioners, technologists, technicians, and related health workers	610	.09	8	7
Designers, except interior designers	1,500	.23	10	11
All other professional, paraprofessional, and technical workers	5,080	.78	n.a.	n.a.

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 26)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sales and related occupations	20,450	3.13	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	1,850	.28	6	14
Sales representatives, scientific and related products and services, except retail	2,990	.46	7	14
Sales representatives, except scientific and related products or services and retail	13,530	2.07	2	52
All other sales and related workers	2,080	.32	8	10
Clerical and administrative support occupations	63,140	9.66	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	2,490	.38	7	19
Secretaries	11,630	1.78	9	66
Stenographers	750	.11	16	4
Receptionists and information clerks	760	.12	5	13
Typists	1,250	.19	7	8
Typists, word processing equipment	410	.06	14	3
Personnel clerks, except payroll and timekeeping	910	.14	5	14
File clerks	470	.07	9	5
Order clerks, materials, merchandise, and service	2,730	.42	4	18
Procurement clerks	710	.11	4	11
Bookkeeping, accounting, and auditing clerks	7,420	1.14	4	57
Payroll and timekeeping clerks	1,680	.26	2	26
Billing, cost and rate clerks	2,370	.36	7	21
General office clerks	6,820	1.04	3	45
Electronic data processing and other office machine operators	3,430	.52	n.a.	n.a.
Billing, posting, and calculating machine operators	350	.05	7	4
Computer operators, except peripheral equipment	1,120	.17	6	12
Data entry keyers, except composing	1,580	.24	11	12
All other office machine operators	380	.06	22	2
Switchboard operators	1,020	.16	3	20
Material recording, scheduling, dispatching, and distributing workers	16,610	2.54	n.a.	n.a.
Production, planning, and expediting clerks	3,780	.58	4	27
Weighers, measurers, checkers, and samplers, recordkeeping	890	.14	8	5
Stock clerks, stockroom, warehouse or storage yard	3,060	.47	5	18
Traffic, shipping, and receiving clerks	8,080	1.24	2	60
All other material recording, scheduling, and distributing workers	800	.12	12	4
All other clerical and administrative support workers	1,680	.26	21	6
Service occupations	9,340	1.43	n.a.	n.a.
First-line supervisors and manager/supervisors, service	650	.10	9	4
Guards and watch guards	1,800	.28	7	7
Cleaning and building service workers, except private households	6,180	.95	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	5,760	.88	4	44
All other cleaning and building service workers, except private households	420	.06	11	3
All other service workers	710	.11	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	2,970	.45	n.a.	n.a.
Log handling equipment operators	1,540	.24	15	2

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 26)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Logging tractor operators	270	0.04	22	1
Gardeners and groundskeepers, except farm	290	.04	18	2
All other agriculture, forestry, fishing, and related workers	870	.13	20	1
Production, construction, operating, maintenance, and material handling occupations	484,860	74.20	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	34,920	5.34	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	4,050	.62	4	21
First-line supervisors and manager/supervisors - construction trades and extractive workers	590	.09	36	2
First-line supervisors and manager/supervisors - production and operating workers	27,380	4.19	2	80
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	1,310	.20	4	14
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,590	.24	9	9
Precision inspectors, testers, and graders	1,220	.19	9	4
Production inspectors, testers, graders, sorters, samplers, and weighers	11,570	1.77	4	29
Mechanics, installers, and repairers	43,430	6.65	n.a.	n.a.
Machinery maintenance mechanics	13,280	2.03	n.a.	n.a.
Machinery maintenance mechanics, water or power generation plant	3,660	.56	10	11
All other machinery maintenance mechanics	9,620	1.47	6	17
Millwrights	6,550	1.00	5	7
Machinery maintenance workers	2,900	.44	5	11
Maintenance repairers, general utility	15,550	2.38	5	47
Automotive mechanics	640	.10	8	4
Bus and truck mechanics and diesel engine specialists	520	.08	10	4
Precision instrument repairers	2,440	.37	8	6
Mechanical control and valve installers and repairers	100	.02	40	(*)
Riggers	230	.04	25	1
All other mechanics, installers, and repairers	1,220	.19	18	3
Construction trades workers, except material moving	13,480	2.06	n.a.	n.a.
Carpenters	940	.14	6	6
Electricians	6,490	.99	4	18
Painters and paperhangers, construction and maintenance	840	.13	6	5
Plumbers, pipefitters, and steamfitters	3,900	.60	6	6
All other construction trades workers	1,310	.20	13	2
Precision metal workers	4,970	.76	n.a.	n.a.
Tool-and-die makers	1,090	.17	6	8
Machinists	2,900	.44	8	10
Tool grinders, filers, sharpeners, and other precision grinders	380	.06	8	3
Boilermakers	350	.05	15	1
All other precision metal workers	250	.04	17	1
Precision printing workers	750	.11	n.a.	n.a.
Precision compositors, typesetters, and arrangers	380	.06	10	3
All other precision printing workers	370	.06	14	2
Precision workers, nec	370	.06	n.a.	n.a.

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 26)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Precision detail design decorators, and painters	100	0.02	19	1
All other precision workers, nec	270	.04	17	2
Machine setters, set-up operators, and tenders, metal and plastic	3,430	.52	n.a.	n.a.
Punching machine setters and set-up operators, metal and plastic	380	.06	20	1
Press and press brake machine setters and set-up operators, metal and plastic	260	.04	22	1
Machine forming operators and tenders, metal and plastic	2,100	.32	12	3
Combination machine tool operators and tenders, metal and plastic	340	.05	38	(*)
All other machine setters and set-up operators, metal and plastic	350	.05	n.a.	n.a.
All other machine operators and tenders, metal and plastic	780	.12	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic	208,480	31.90	n.a.	n.a.
Printing press machine setters and set-up operators	5,150	.79	5	12
Photoengraving and lithographing photographers	520	.08	14	3
Specialty materials printing machine setters and set-up operators	4,960	.76	6	11
Screen printing machine setters and set-up operators	680	.10	20	2
All other printing related setters and set-up operators	1,060	.16	10	3
Printing press machine operators and tenders	16,660	2.55	3	35
Photoengraving and lithographing machine operators and tenders	460	.07	11	3
Bindery machine operators	780	.12	13	3
All other printing, binding, and related machine operators and tenders	1,410	.22	11	3
Paper goods machine setters and set-up operators	54,820	8.39	3	53
Boiler operators and tenders, low pressure	3,060	.47	6	8
Chemical equipment controllers and operators	2,650	.41	7	5
Chemical equipment tenders	2,320	.36	10	4
Cutting and slicing machine setters and set-up operators	5,350	.82	5	21
Cutting and slicing machine operators and tenders	18,230	2.79	4	41
Coating, painting, and spraying machine setters and set-up operators	2,190	.34	10	4
Coating, painting, and spraying machine operators and tenders	5,480	.84	6	12
Cementing and gluing machine operators and tenders	9,840	1.51	5	25
Cleaning, washing, and pickling equipment operators and tenders	1,970	.30	10	3
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	1,690	.26	9	3
Crushing, grinding, mixing, and blending machine operators and tenders	7,960	1.22	5	9
Extruding, forming, pressing, and compacting machine setters and set-up operators	3,270	.50	12	5
Extruding, forming, pressing, and compacting machine operators and tenders	6,690	1.02	7	16
Packaging and filling machine operators and tenders	11,780	1.80	6	18
All other machine setters and set-up operators, except metal and plastic	3,080	.47	10	4

See footnotes at end of table.

Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 26)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other machine operators and tenders, except metal and plastic	35,640	5.45	4	19
Other hand workers, nec	19,710	3.02	n.a.	n.a.
Welders and cutters	1,580	.24	7	5
Solderers and brazers	80	.01	30	[3]
Cutters and trimmers, hand	1,550	.24	9	5
Assemblers and fabricators, except machine, electrical, electronic, and precision	11,160	1.71	6	14
All other hand workers, nec	5,340	.82	9	6
Plant and system workers	6,770	1.04	n.a.	n.a.
Water and liquid waste treatment plant and system operators	1,060	.16	7	4
Chemical plant and system operators	550	.08	14	1
Power distributors and dispatchers	1,360	.21	10	3
Stationary engineers	1,780	.27	7	5
All other plant and system operators	2,020	.31	15	2
Motor vehicle operators	9,990	1.53	n.a.	n.a.
Truck drivers, heavy or tractor trailer	7,330	1.12	3	37
Truck drivers, light, include delivery and route workers	2,260	.35	8	19
All other motor vehicle operators	400	.06	17	1
Rail yard engineers, dinkey operators, and hostlers	110	.02	14	1
Railroad brake, signal, and switch operators	180	.03	17	1
All other transportation and motor vehicle operators	140	.02	17	1
Material moving equipment operators	25,610	3.92	n.a.	n.a.
Hoist and winch operators	270	.04	25	1
Crane and tower operators	1,200	.18	8	4
Industrial truck and tractor operators	20,920	3.20	2	49
Conveyor operators and tenders	1,820	.28	8	6
Pump operators	300	.05	24	1
All other material moving equipment operators	1,100	.17	10	3
Helpers - mechanics and repairers	1,160	.18	9	5
Construction trades and extractive worker helpers	450	.07	15	1
Machine feeders and offbearers	24,890	3.81	3	35
Freight, stock, and material movers, hand	10,390	1.59	4	30
Hand packers and packagers	21,100	3.23	4	27
All other helpers, laborers, and material movers, hand	41,740	6.39	4	23

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Printing and Publishing

Establishments in this industry perform any of the following operations: (1) Letterpress, lithography, gravure, or screen printing; (2) bookbinding, typesetting, engraving, photoengraving, and electrotyping; and (3) publishing newspapers, books, and periodicals, whether or not they do their own printing. These establishments employed nearly 1.3 million workers, or 7 percent of manufacturing and 17 percent of nondurable goods employment in 1983. One-third of the workers were in establishments publishing (or publishing and printing) newspapers; another one-third worked in establishments engaged in commercial printing; and less than one-tenth worked in establishments which publish (or publish and print) books and pamphlets.

Unlike most other industries surveyed in the manufacturing sector of the economy, employment in the printing and publishing industry increased by 2 percent between 1980 and 1983.

Managerial and administrative workers decreased from 10 percent of total employment in 1980 to 7 percent in 1983. Sales workers and clerical and administrative support workers, however, both increased as a percentage of total industry employment. Text table 8 shows employment by major occupational group since 1977.

Although still the largest occupational group in the printing and publishing industry, the 602,150 production and related workers accounted for only about half of total industry employment (table 11), a smaller proportion than in any other manufacturing industry surveyed. Clerical workers accounted for 24 percent. Professional, paraprofessional, and technical workers made up 11 percent of industry employment; sales workers, 10 percent; managerial and administrative workers, 7 percent; and service workers, 1 percent.

The five most populous occupations in printing and publishing are listed below:

	Employment	*Percent of industry employment*
General managers and top executives	63,060	4.9
Sales representatives	62,530	4.9
Printing press machine operators and tenders	60,390	4.7
Offset lithographic press setters and setup operators	55,690	4.3
Writers and editors	50,710	3.9

Text table 8. Printing and publishing: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,132,880	1,254,300	1,286,710	13.6
Managerial and administrative workers	97,070	126,830	[1]91,520	-5.7
Professional, paraprofessional, and technical workers	121,430	136,890	147,490	21.5
Sales workers	73,050	92,890	[2]123,560	69.1
Clerical workers	239,570	264,290	302,560	26.3
Production and related workers	582,510	612,420	602,150	3.4
Service workers	19,250	20,980	19,200	-0.3

[1] A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. See footnote 1 to text table 1.

[2] Includes 7,722 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 27)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,286,710	100.00	—	—
Managerial and administrative occupations	91,520	7.11	n.a.	n.a.
Financial managers	3,350	.26	2	9
Personnel, training, and labor relations managers	1,750	.14	2	6
Purchasing managers	1,020	.08	3	4
Marketing, advertising, and public relations managers	6,050	.47	3	8
Administrative services managers	2,940	.23	8	4
Industrial production managers	5,180	.40	3	8
General managers and top executives	63,060	4.90	1	79
All other managers and administrators	8,170	.63	7	5
Professional, paraprofessional, and technical occupations	147,490	11.46	n.a.	n.a.
Management support workers	11,260	.88	n.a.	n.a.
Accountants, auditors, and other financial specialists	4,100	.32	n.a.	n.a.
Accountants and auditors	3,040	.24	4	6
Budget analysts	380	.03	7	1
All other financial specialists	680	.05	10	1
Purchasing agents, except wholesale and retail trade, and farm products	1,330	.10	3	4
Personnel, training, and labor relations specialists	890	.07	4	2
Cost estimators	2,820	.22	4	5
All other management support workers	2,120	.16	6	2
Engineers	1,260	.10	n.a.	n.a.
Industrial engineers, except safety	500	.04	6	1
Mechanical engineers	530	.04	9	1
All other engineers	230	.02	12	[3]
Engineering and related technicians and technologists	3,930	.31	n.a.	n.a.
Industrial engineering technicians and technologists	150	.01	13	[3]
Drafters	3,100	.24	7	4
All other engineering and related technicians and technologists	680	.05	13	1
Computer scientists and related workers	8,850	.69	n.a.	n.a.
Systems analysts, electronic data processing	2,970	.23	5	5
Computer programmers	4,670	.36	4	8
All other computer systems analysts, programmers, and programmer aides	1,210	.09	n.a.	n.a.
Mathematical scientists and related workers	320	.02	n.a.	n.a.
Librarians, professional	1,360	.11	9	3
Health practitioners, technologists, technicians, and related health workers	180	.01	11	1
Writers and editors	50,710	3.94	2	27
Technical writers	1,380	.11	12	1
Public relations specialists and publicity writers	1,160	.09	10	1
Reporters and correspondents	41,670	3.24	2	15
Photographers	5,480	.43	3	6
Artists and related workers	11,140	.87	3	11
Designers, except interior designers	3,160	.25	6	3
All other professional, paraprofessional, and technical workers	5,630	.44	n.a.	n.a.
Sales and related occupations	123,570	9.60	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	7,720	.60	5	6
Sales agents, advertising	20,290	1.58	3	7

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 27)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sales representatives, scientific and related products and services, except retail	9,940	0.77	4	9
Sales representatives, except scientific and related products or services and retail	62,530	4.86	2	42
Cashiers	1,380	.11	7	2
News and street vendors, telephone solicitors, door-to-door sales workers, and other related workers	16,600	1.29	15	2
All other sales and related workers	5,110	.40	9	3
Clerical and administrative support occupations	302,520	23.51	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	7,840	.61	3	8
Library assistants and bookmobile drivers	680	.05	7	1
Advertising clerks	10,490	.82	4	5
Proofreaders and copy markers	18,640	1.45	2	24
Secretaries	42,180	3.28	2	52
Stenographers	970	.08	13	1
Receptionists and information clerks	2,750	.21	6	6
Typists	10,840	.84	3	13
Typists, word processing equipment	7,520	.58	4	10
Personnel clerks, except payroll and timekeeping	1,070	.08	3	4
File clerks	2,690	.21	6	3
Order clerks, materials, merchandise, and service	9,060	.70	4	5
Procurement clerks	760	.06	5	2
Statistical clerks	820	.06	9	1
Interviewing clerks, except personnel and social welfare	950	.07	18	[3]
Bookkeeping, accounting, and auditing clerks	35,170	2.73	1	55
Payroll and timekeeping clerks	2,060	.16	3	6
Billing, cost and rate clerks	4,100	.32	3	6
General office clerks	44,330	3.45	3	40
Electronic data processing and other office machine operators	45,180	3.51	n.a.	n.a.
Billing, posting, and calculating machine operators	1,330	.10	6	2
Duplicating machine operators	810	.06	13	2
Mail machine operators, preparation and handling	12,800	.99	5	9
Computer operators, except peripheral equipment	3,650	.28	6	5
Peripheral EDP equipment operators	510	.04	9	1
Data entry keyers, except composing	5,160	.40	5	5
Data keyers, composing	20,130	1.56	3	18
All other office machine operators	790	.06	14	1
Switchboard operators	3,040	.24	2	8
Mail clerks, except mail machine operators and postal service	7,100	.55	5	9
Messengers	4,470	.35	4	5
Material recording, scheduling, dispatching, and distributing workers	31,770	2.47	n.a.	n.a.
Dispatchers, except police, fire, and ambulance	720	.06	8	1
Production, planning, and expediting clerks	5,770	.45	3	6
Weighers, measurers, checkers, and samplers, recordkeeping	290	.02	12	[3]
Stock clerks, stockroom, warehouse or storage yard	6,950	.54	4	11
Traffic, shipping, and receiving clerks	16,680	1.30	2	22
All other material recording, scheduling, and distributing workers	1,360	.11	11	1
All other clerical and administrative support workers	8,040	.62	10	3

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 27)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Service occupations	19,200	1.49	n.a.	n.a.
First-line supervisors and manager/supervisors, service	960	.07	6	2
Guards and watch guards	1,870	.15	6	2
Food and beverage preparation and service workers	410	.03	11	([3])
Cleaning and building service workers, except private households	15,260	1.19	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	14,470	1.12	2	24
All other cleaning and building service workers, except private households	790	.06	n.a.	n.a.
All other service workers	700	.05	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	230	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm	230	.02	12	1
Production, construction, operating, maintenance, and material handling occupations	602,180	46.80	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	39,460	3.07	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	820	.06	5	2
First-line supervisors and manager/supervisors - production and operating workers	36,000	2.80	1	44
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	1,310	.10	6	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,330	.10	8	2
Precision inspectors, testers, and graders	640	.05	14	1
Production inspectors, testers, graders, sorters, samplers, and weighers	4,680	.36	6	3
Mechanics, installers, and repairers	11,910	.93	n.a.	n.a.
Machinery maintenance mechanics	3,060	.24	6	3
Machinery maintenance workers	740	.06	16	1
Maintenance repairers, general utility	6,660	.52	3	12
Automotive mechanics	340	.03	14	1
Bus and truck mechanics and diesel engine specialists	270	.02	18	([3])
All other mechanics, installers, and repairers	840	.07	n.a.	n.a.
Construction trades workers, except material moving	2,310	.18	n.a.	n.a.
Carpenters	350	.03	7	1
Electricians	1,560	.12	5	2
Plumbers, pipefitters, and steamfitters	180	.01	12	([3])
All other construction trades workers	220	.02	n.a.	n.a.
Precision metal workers	2,520	.20	n.a.	n.a.
Machinists	1,620	.13	10	1
Precision etchers and engravers, hand or machine	650	.05	20	1
All other precision metal workers	250	.02	n.a.	n.a.
Precision printing workers	88,330	6.86	n.a.	n.a.
Precision compositors, typesetters, and arrangers	20,960	1.63	3	19
Job printers	15,690	1.22	4	15
Precision lithography and photoengraving workers	40,310	3.13	2	30
Bookbinders	9,310	.72	6	6

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 27)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other precision printing workers	2,060	0.16	11	1
Precision workers, nec	18,170	1.41	n.a.	n.a.
Precision detail design decorators, and painters	4,720	.37	7	5
Precision photographic process workers	2,030	.16	9	2
All other precision workers, nec	11,420	.89	4	7
Machine setters, set-up operators, and tenders, except metal and plastic	289,830	22.52	n.a.	n.a.
Offset lithographic press setters and set-up operators	55,690	4.33	2	30
Letterpress setters and set-up operators	19,300	1.50	4	13
All other printing press setters and set-up operators	6,020	.47	9	2
Photoengraving and lithographing photographers	17,510	1.36	2	26
Specialty materials printing machine setters and set-up operators	1,680	.13	18	[3]
Screen printing machine setters and set-up operators	2,220	.17	13	1
Bindery machine setters and set-up operators	23,670	1.84	3	20
All other printing related setters and set-up operators	3,570	.28	12	1
Typesetting and composing machine operators and tenders	32,340	2.51	3	31
Printing press machine operators and tenders	60,390	4.69	2	31
Photoengraving and lithographing machine operators and tenders	3,000	.23	9	2
Bindery machine operators	31,040	2.41	3	18
All other printing, binding, and related machine operators and tenders	11,000	.85	9	3
Paper goods machine setters and set-up operators	2,350	.18	12	1
Cutting and slicing machine setters and set-up operators	960	.07	10	1
Cutting and slicing machine operators and tenders	2,750	.21	6	2
Cementing and gluing machine operators and tenders	1,730	.13	11	1
Packaging and filling machine operators and tenders	9,220	.72	10	4
All other machine setters and set-up operators, except metal and plastic	2,050	.16	14	1
All other machine operators and tenders, except metal and plastic	3,340	.26	12	1
Other hand workers, nec	18,740	1.46	n.a.	n.a.
Cutters and trimmers, hand	660	.05	15	1
Painting, coating, and decorating, workers, hand	150	.01	37	[3]
Engraving and printing workers, hand	790	.06	19	1
All other hand workers, nec	17,140	1.33	5	4
Motor vehicle operators	35,210	2.74	n.a.	n.a.
Truck drivers, heavy or tractor trailer	1,920	.15	12	1
Truck drivers, light, include delivery and route workers	18,510	1.44	4	26
Driver/sales workers	14,100	1.10	7	3
All other motor vehicle operators	680	.05	18	1
All other transportation and motor vehicle operators	250	.02	14	[3]
Material moving equipment operators	6,620	.51	n.a.	n.a.
Industrial truck and tractor operators	5,420	.42	6	3
All other material moving equipment operators	1,200	.09	20	[3]
Helpers - mechanics and repairers	580	.05	8	1
Machine feeders and offbearers	33,460	2.60	3	12
Freight, stock, and material movers, hand	18,560	1.44	3	15

See footnotes at end of table.

Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1993—Continued

(SIC 27)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Hand packers and packagers	12,040	0.94	6	3
All other helpers, laborers, and material movers, hand	18,280	1.42	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations	590	.05	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Chemicals and Allied Products

Establishments which produce basic chemicals and manufacture products by predominantly chemical processes employed 1.1 million workers, accounting for 6 percent of manufacturing and 14 percent of nondurable goods employment in 1983. Of these workers, 19 percent worked in establishments manufacturing, fabricating, or processing medicinal chemicals and pharmaceutical products; 16 percent worked in establishments producing plastics materials and synthetic resins, synthetic rubber, and synthetic and other manmade fibers, except glass; and 16 percent worked in establishments manufacturing industrial organic chemicals.

As shown in table 12, the 546,840 production and related workers in the chemical and allied products industry accounted for over half (52 percent) of total industry employment. Professional, paraprofessional, and technical workers ranked second with 19 percent. The remaining employment was distributed as follows: Clerical workers, 15 percent; managerial and administrative workers, 8 percent; sales workers, 4 percent; and service workers, 2 percent. The change in occupational employment between 1977 and 1983 is shown in text table 9.

The five most populous occupations in manufacturing chemicals and allied products are listed in the tabulation below:

	Employment	*Percent of industry employment*
Packaging and filling machine operators and tenders	51,480	4.9
Chemical equipment controllers and operators	44,180	4.2
First-line supervisors, production	41,980	4.0
Secretaries	39,650	3.8
Chemical technicians and technologists, except health	37,640	3.6

Text table 9. Chemicals and allied products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,081,980	1,116,820	1,053,520	- 2.6
Managerial and administrative workers	96,960	110,000	86,400	-10.9
Professional, paraprofessional, and technical workers	179,290	196,640	202,040	12.7
Sales workers	55,360	35,290	38,270	-30.9
Clerical workers	160,600	162,670	153,900	- 4.2
Production and related workers	564,030	587,520	546,840	- 3.0
Service workers	25,740	24,700	23,560	- 8.5

Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 28)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,053,570	100.00	—	—
Managerial and administrative occupations	86,400	8.20	n.a.	n.a.
Financial managers	5,490	.52	6	18
Personnel, training, and labor relations managers	3,700	.35	5	19
Purchasing managers	1,860	.18	3	15
Marketing, advertising, and public relations managers	6,700	.64	7	11
Administrative services managers	2,810	.27	12	9
Industrial production managers	9,570	.91	5	21
General managers and top executives	32,300	3.07	4	86
All other managers and administrators	23,970	2.28	7	19
Professional, paraprofessional, and technical occupations	202,050	19.18	n.a.	n.a.
Management support workers	33,710	3.20	n.a.	n.a.
Accountants, auditors, and other financial specialists	14,540	1.38	n.a.	n.a.
Accountants and auditors	10,940	1.04	4	36
Budget analysts	1,190	.11	6	6
All other financial specialists	2,410	.23	11	4
Purchasing agents, except wholesale and retail trade, and farm products	4,050	.38	3	20
Personnel, training, and labor relations specialists	3,920	.37	5	13
Cost estimators	790	.07	8	3
Compliance officers and enforcement inspectors, except construction	1,170	.11	13	4
All other management support workers	9,240	.88	10	8
Engineers	40,910	3.88	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	560	.05	12	1
Chemical engineers	17,660	1.68	4	24
Civil engineers, including traffic	1,570	.15	14	3
Agricultural engineers	120	.01	35	[3]
Electrical and electronic engineers	3,520	.33	9	8
Industrial engineers, except safety	3,360	.32	9	7
Safety engineers, except mining	1,540	.15	6	9
Mechanical engineers	8,290	.79	6	19
All other engineers	4,290	.41	10	6
Engineering and related technicians and technologists	12,450	1.18	n.a.	n.a.
Civil engineering technicians and technologists	320	.03	13	1
Electrical and electronic engineering technicians and technologists	2,500	.24	13	4
Industrial engineering technicians and technologists	1,150	.11	18	2
Mechanical engineering technicians and technologists	1,370	.13	14	2
Drafters	3,470	.33	11	10
All other engineering and related technicians and technologists	3,640	.35	10	4
Physical scientists	31,750	3.01	n.a.	n.a.
Physicists and astronomers	240	.02	16	1
Chemists, except biochemists	30,110	2.86	4	46
All other physical scientists	1,400	.13	12	3
Life scientists	11,470	1.09	n.a.	n.a.
Agricultural and food scientists	480	.05	17	1
Biological scientists	7,650	.73	10	7
Medical scientists	2,120	.20	19	1
All other life scientists	1,220	.12	18	1
Physical and life science technicians and technologists	44,440	4.22	n.a.	n.a.

See footnotes at end of table.

Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 28)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Biological, agricultural, and food technicians and technologists, except health	4,180	0.40	12	3
Chemical technicians and technologists, except health	37,640	3.57	4	40
All other physical and life science technicians and technologists	2,620	.25	10	3
Computer scientists and related workers	11,650	1.11	n.a.	n.a.
Systems analysts, electronic data processing	6,160	.58	8	10
Computer programmers	4,180	.40	6	11
Computer programmer aides	1,190	.11	7	5
Programmers - numerical, tool, and process control	120	.01	19	(*)
Mathematical scientists and related workers	1,810	.17	n.a.	n.a.
Operations and systems researchers and analysts, except computer	840	.08	12	2
Statisticians	790	.07	14	2
All other mathematical scientists	180	.02	29	(*)
Lawyers	1,830	.17	11	3
Physicians and surgeons	360	.03	10	3
Veterinarians and veterinary inspectors	290	.03	15	1
Registered nurses	1,360	.13	4	9
Pharmacists	300	.03	27	(*)
All other health professionals, paraprofessional and technicians	930	.09	14	3
Writers and editors	720	.07	17	2
Technical writers	530	.05	18	2
Public relations specialists and publicity writers	520	.05	17	2
Designers, except interior designers	1,210	.11	12	3
All other professional, paraprofessional, and technical workers	5,810	.55	n.a.	n.a.
Sales and related occupations	38,270	3.63	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	4,440	.42	9	7
Sales engineers	3,770	.36	8	9
Sales representatives, scientific and related products and services, except retail	21,040	2.00	4	35
Sales representatives, except scientific and related products or services and retail	5,850	.56	8	7
All other sales and related workers	3,170	.30	9	5
Clerical and administrative support occupations	153,910	14.61	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	5,940	.56	7	16
Secretaries	39,650	3.76	4	70
Stenographers	3,020	.29	10	4
Receptionists and information clerks	1,230	.12	5	9
Typists	5,190	.49	6	16
Typists, word processing equipment	2,820	.27	7	9
Personnel clerks, except payroll and timekeeping	2,310	.22	5	12
File clerks	1,410	.13	7	5
Order clerks, materials, merchandise, and service	4,890	.46	7	13
Procurement clerks	1,920	.18	4	12
Statistical clerks	960	.09	13	3
Bookkeeping, accounting, and auditing clerks	14,640	1.39	3	53
Payroll and timekeeping clerks	2,240	.21	2	17
Billing, cost and rate clerks	4,220	.40	5	13
General office clerks	18,510	1.76	4	46
Electronic data processing and other office machine operators	8,520	.81	n.a.	n.a.

See footnotes at end of table.

Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 28)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Billing, posting, and calculating machine operators	510	0.05	9	2
Computer operators, except peripheral equipment	2,750	.26	5	11
Peripheral EDP equipment operators	660	.06	10	2
Data entry keyers, except composing	3,730	.35	4	13
All other office machine operators	870	.08	9	2
Switchboard operators	1,640	.16	2	16
Material recording, scheduling, dispatching, and distributing workers	30,130	2.86	n.a.	n.a.
Production, planning, and expediting clerks	5,470	.52	4	14
Weighers, measurers, checkers, and samplers, recordkeeping	1,350	.13	10	3
Stock clerks, stockroom, warehouse or storage yard	8,250	.78	3	30
Traffic, shipping, and receiving clerks	13,450	1.28	2	51
All other material recording, scheduling, and distributing workers	1,610	.15	10	4
All other clerical and administrative support workers	4,670	.44	8	7
Service occupations	23,570	2.24	n.a.	n.a.
First-line supervisors and manager/supervisors, service	1,860	.18	7	6
Guards and watch guards	6,380	.61	5	11
Food and beverage preparation and service workers	1,000	.09	12	2
Cleaning and building service workers, except private households	13,420	1.27	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	12,740	1.21	3	31
All other cleaning and building service workers, except private households	680	.06	n.a.	n.a.
All other service workers	910	.09	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	2,520	.24	n.a.	n.a.
Gardeners and groundskeepers, except farm	960	.09	9	3
Animal caretakers, except farm	1,340	.13	13	1
All other agriculture, forestry, fishing, and related workers	220	.02	40	(3)
Production, construction, operating, maintenance, and material handling occupations	546,850	51.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	57,290	5.44	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	9,250	.88	3	17
First-line supervisors and manager/supervisors - construction trades and extractive workers	1,430	.14	10	3
First-line supervisors and manager/supervisors - production and operating workers	41,980	3.98	2	71
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	2,100	.20	4	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	2,530	.24	6	7
Precision inspectors, testers, and graders	3,200	.30	10	3

See footnotes at end of table.

Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 28)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Production inspectors, testers, graders, sorters, samplers, and weighers	14,210	1.35	7	18
Mechanics, installers, and repairers	69,370	6.58	n.a.	n.a.
Machinery maintenance mechanics	21,070	2.00	n.a.	n.a.
Machinery maintenance mechanics, water or power generation plant	5,810	.55	9	8
All other machinery maintenance mechanics	15,260	1.45	5	10
Millwrights	4,650	.44	8	3
Machinery maintenance workers	2,260	.21	8	4
Maintenance repairers, general utility	27,070	2.57	3	46
Automotive mechanics	820	.08	8	3
Bus and truck mechanics and diesel engine specialists	640	.06	10	2
Heating, air conditioning, and refrigeration mechanics and installers	1,150	.11	8	3
Precision instrument repairers	7,360	.70	5	8
Mechanical control and valve installers and repairers	820	.08	10	2
Riggers	930	.09	9	2
All other mechanics, installers, and repairers	2,600	.25	16	2
Construction trades workers, except material moving	26,650	2.53	n.a.	n.a.
Carpenters	2,500	.24	5	6
Electricians	10,800	1.03	5	18
Painters and paperhangers, construction and maintenance	1,830	.17	5	6
Plumbers, pipefitters, and steamfitters	8,510	.81	5	7
Insulation workers	1,450	.14	8	3
All other construction trades workers	1,560	.15	25	2
Extractive and related workers, including blasters	160	.02	25	[3]
Precision metal workers	9,290	.88	n.a.	n.a.
Machinists	6,520	.62	9	9
Sheet- metal workers	1,220	.12	8	3
Boilermakers	1,310	.12	13	2
All other precision metal workers	240	.02	33	[3]
Precision workers, nec	840	.08	13	1
Machine setters, set-up operators, and tenders, except metal and plastic	209,850	19.92	n.a.	n.a.
Textile machine setters and set-up operators	5,640	.54	17	[3]
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	10,960	1.04	11	1
Extruding and forming machine operators and tenders, synthetic or glass fibers	10,730	1.02	9	1
Textile draw-out machine operators and tenders	880	.08	23	[3]
Furnace, kiln, oven, drier, or kettle operators and tenders	3,400	.32	8	3
Boiler operators and tenders, low pressure	2,860	.27	4	5
Cooling and freezing equipment operators and tenders	480	.05	21	1
Chemical equipment controllers and operators	44,180	4.19	3	24
Chemical equipment tenders	14,810	1.41	8	9
Cutting and slicing machine setters and set-up operators	570	.06	17	1
Cutting and slicing machine operators and tenders	1,070	.10	15	1
Coating, painting, and spraying machine setters and set-up operators	530	.05	16	1
Coating, painting, and spraying machine operators and tenders	2,960	.28	10	3
Cleaning, washing, and pickling equipment operators and tenders	1,360	.13	10	2

See footnotes at end of table.

Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 28)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	4,100	0.39	9	3
Crushing, grinding, mixing, and blending machine operators and tenders	29,910	2.84	2	39
Extruding, forming, pressing, and compacting machine setters and set-up operators	2,760	.26	10	4
Extruding, forming, pressing, and compacting machine operators and tenders	5,890	.56	8	5
Packaging and filling machine operators and tenders	51,460	4.89	3	38
All other machine setters and set-up operators, except metal and plastic	3,340	.32	12	3
All other machine operators and tenders, except metal and plastic	11,840	1.12	8	6
Other hand workers, nec	10,640	1.01	n.a.	n.a.
Welders and cutters	2,900	.28	6	5
Solderers and brazers	110	.01	23	[3]
All other hand workers, nec	7,630	.72	10	3
Plant and system workers	42,830	4.07	n.a.	n.a.
Water and liquid waste treatment plant and system operators	3,040	.29	25	4
Gas plant operators	410	.04	18	[3]
Chemical plant and system operators	31,930	3.03	4	13
Power distributors and dispatchers	1,260	.12	15	1
Stationary engineers	2,130	.20	8	3
All other plant and system operators	4,060	.39	12	2
Motor vehicle operators	13,180	1.25	n.a.	n.a.
Truck drivers, heavy or tractor trailer	8,180	.78	3	23
Truck drivers, light, include delivery and route workers	4,430	.42	6	19
All other motor vehicle operators	570	.05	14	2
Rail yard engineers, dinkey operators, and hostlers	310	.03	11	1
Railroad brake, signal, and switch operators	320	.03	11	1
All other transportation and motor vehicle operators	180	.02	23	[3]
Material moving equipment operators	23,330	2.21	n.a.	n.a.
Tank car and truck loaders	2,680	.25	5	5
Hoist and winch operators	130	.01	16	[3]
Crane and tower operators	580	.06	8	2
Industrial truck and tractor operators	15,640	1.48	3	25
Conveyor operators and tenders	1,200	.11	12	2
Pump operators	2,030	.19	6	5
All other material moving equipment operators	1,070	.10	n.a.	n.a.
Helpers - mechanics and repairers	1,880	.18	8	4
Construction trades and extractive worker helpers	540	.05	13	1
Machine feeders and offbearers	3,870	.37	9	2
Freight, stock, and material movers, hand	10,620	1.01	5	9
Hand packers and packagers	21,890	2.08	15	6
All other helpers, laborers, and material movers, hand	26,400	2.51	5	15

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Petroleum Refining and Related Industries

Establishments which refine petroleum, manufacture paving and roofing materials, and compound lubricating oils and greases from purchased materials employed 196,960 workers in 1983, or only 1 percent of manufacturing and 3 percent of nondurable goods employment. Over four-fifths of these workers were engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products.

The 117,050 production and related workers in this industry (table 13), accounted for 59 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 19 percent. Clerical workers accounted for 13 percent; managerial and administrative workers, 5 percent; sales workers, 2 percent; and service workers, 1 percent.

The five most populous occupations in the manufacture of refined petroleum and related products are listed in the tabulation below:

	Employment	*Percent of industry employment*
Petroleum refinery and control panel operators	15,340	7.8
First-line supervisors, production	8,480	4.3
Chemical equipment controllers and operators	7,540	3.8
Maintenance repairers, general utility	5,410	2.7
Chemical technicians and technologists	4,970	2.5

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 29)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	196,940	100.00	--	--
Managerial and administrative occupations	10,760	5.46	n.a.	n.a.
Financial managers	800	.41	16	13
Personnel, training, and labor relations managers	630	.32	11	18
Purchasing managers	240	.12	13	11
Marketing, advertising, and public relations managers	470	.24	18	9
Administrative services managers	430	.22	13	9
Industrial production managers	1,340	.68	10	16
Mining, quarrying, and oil and gas well drilling managers	140	.07	33	1
General managers and top executives	3,780	1.92	5	78
All other managers and administrators	2,930	1.49	11	15
Professional, paraprofessional, and technical occupations	37,420	19.00	n.a.	n.a.
Management support workers	9,070	4.61	n.a.	n.a.
Accountants, auditors, and other financial specialists	4,350	2.21	n.a.	n.a.
Accountants and auditors	3,330	1.69	16	31
Budget analysts	240	.12	13	5
All other financial specialists	780	.40	21	4
Purchasing agents, except wholesale and retail trade, and farm products	860	.44	6	26
Personnel, training, and labor relations specialists	1,040	.53	11	11
Cost estimators	220	.11	20	4
All other management support workers	2,600	1.32	22	7
Engineers	10,610	5.39	n.a.	n.a.
Petroleum engineers	380	.19	21	3
Chemical engineers	4,530	2.30	9	14
Civil engineers, including traffic	560	.28	13	6
Electrical and electronic engineers	840	.43	13	8
Industrial engineers, except safety	820	.42	22	6
Safety engineers, except mining	410	.21	9	10
Mechanical engineers	2,420	1.23	9	15
All other engineers	650	.33	16	5
Engineering and related technicians and technologists	2,830	1.44	n.a.	n.a.
Civil engineering technicians and technologists	170	.09	26	2
Electrical and electronic engineering technicians and technologists	440	.22	16	5
Industrial engineering technicians and technologists	210	.11	28	2
Mechanical engineering technicians and technologists	440	.22	19	4
Drafters	950	.48	11	11
All other engineering and related technicians and technologists	620	.31	24	4
Physical scientists	3,370	1.71	n.a.	n.a.
Chemists, except biochemists	2,500	1.27	10	29
Geologists, geophysicists, and oceanographers	780	.40	26	1
All other physical scientists	90	.05	17	2
Physical and life science technicians and technologists	6,230	3.16	n.a.	n.a.
Chemical technicians and technologists, except health	4,970	2.52	10	25
Petroleum technicians and technologists	760	.39	19	7
All other physical and life science technicians and technologists	500	.25	42	2
Computer scientists and related workers	3,390	1.72	n.a.	n.a.

See footnotes at end of table.

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 29)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Systems analysts, electronic data processing	1,760	0.89	19	7
Computer programmers	1,420	.72	21	10
Computer programmer aides	210	.11	26	4
Mathematical scientists and related workers	130	.07	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers	380	.19	22	7
Public relations specialists and publicity writers	100	.05	17	3
All other professional, paraprofessional, and technical workers	1,310	.67	n.a.	n.a.
Sales and related occupations	4,800	2.44	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	550	.28	27	5
Sales representatives, scientific and related products and services, except retail	680	.35	9	13
Sales representatives, except scientific and related products or services and retail	2,200	1.12	7	30
All other sales and related workers	1,370	.70	44	3
Clerical and administrative support occupations	24,770	12.58	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,490	.76	16	15
Secretaries	4,720	2.40	8	60
Stenographers	930	.47	28	5
Receptionists and information clerks	170	.09	10	8
Typists	330	.17	14	6
Typists, word processing equipment	230	.12	12	4
Personnel clerks, except payroll and timekeeping	430	.22	10	10
File clerks	230	.12	18	4
Order clerks, materials, merchandise, and service	970	.49	11	25
Procurement clerks	290	.15	12	9
Bookkeeping, accounting, and auditing clerks	3,700	1.88	10	49
Payroll and timekeeping clerks	450	.23	9	15
Billing, cost and rate clerks	420	.21	10	10
General office clerks	3,960	2.01	11	43
Electronic data processing and other office machine operators	1,710	.87	n.a.	n.a.
Billing, posting, and calculating machine operators	90	.05	30	2
Computer operators, except peripheral equipment	710	.36	17	7
Data entry keyers, except composing	600	.30	18	8
All other office machine operators	310	.16	24	3
Switchboard operators	280	.14	7	13
Material recording, scheduling, dispatching, and distributing workers	3,400	1.73	n.a.	n.a.
Production, planning, and expediting clerks	1,160	.59	10	12
Weighers, measurers, checkers, and samplers, recordkeeping	240	.12	23	3
Stock clerks, stockroom, warehouse or storage yard	1,300	.66	7	23
Traffic, shipping, and receiving clerks	620	.31	13	11
All other material recording, scheduling, and distributing workers	80	.04	20	3
All other clerical and administrative support workers	1,060	.54	25	6
Service occupations	2,120	1.08	n.a.	n.a.
First-line supervisors and manager/supervisors, service	160	.08	14	4

See footnotes at end of table.

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 29)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Guards and watch guards	830	0.42	10	8
Food and beverage preparation and service workers	110	.06	33	1
Cleaning and building service workers, except private households	860	.44	n.a.	n.a.
All other service workers	160	.08	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	40	.02	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations	117,030	59.42	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	13,250	6.73	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	3,060	1.55	8	15
First-line supervisors and manager/supervisors - construction trades and extractive workers	810	.41	13	7
First-line supervisors and manager/supervisors - production and operating workers	8,480	4.31	4	69
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	460	.23	9	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	440	.22	13	7
Precision inspectors, testers, and graders	880	.45	14	7
Production inspectors, testers, graders, sorters, samplers, and weighers	1,620	.82	9	11
Mechanics, installers, and repairers	14,050	7.13	n.a.	n.a.
Machinery maintenance mechanics	4,240	2.15	7	29
Machinery maintenance workers	210	.11	19	3
Maintenance repairers, general utility	5,410	2.75	9	39
Automotive mechanics	470	.24	9	12
Bus and truck mechanics and diesel engine specialists	230	.12	14	5
Precision instrument repairers	2,400	1.22	8	10
Mechanical control and valve installers and repairers	380	.19	21	2
Riggers	350	.18	15	3
All other mechanics, installers, and repairers	360	.18	22	3
Construction trades workers, except material moving	9,290	4.72	n.a.	n.a.
Carpenters	1,000	.51	10	10
Electricians	2,410	1.22	7	15
Painters and paperhangers, construction and maintenance	410	.21	14	6
Plumbers, pipefitters, and steamfitters	3,880	1.97	10	10
Pipelayers	150	.08	30	1
Insulation workers	760	.39	10	7
All other construction trades workers	680	.35	n.a.	n.a.
Extractive and related workers, including blasters	180	.09	29	1
Precision metal workers	4,720	2.40	n.a.	n.a.
Machinists	3,060	1.55	12	9
Boilermakers	1,560	.79	12	5
All other precision metal workers	100	.05	23	2
Precision workers, nec	100	.05	34	1
Machine setters, set-up operators, and tenders, except metal and plastic	20,440	10.38	n.a.	n.a.

See footnotes at end of table.

Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1993—Continued

(SIC 29)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Furnace, kiln, oven, drier, or kettle operators and tenders	910	0.46	14	5
Boiler operators and tenders, low pressure	650	.33	12	6
Chemical equipment controllers and operators	7,540	3.83	13	10
Chemical equipment tenders	930	.47	21	4
Cutting and slicing machine setters and set-up operators	60	.03	27	1
Cutting and slicing machine operators and tenders	170	.09	21	2
Coating, painting, and spraying machine setters and set-up operators	510	.26	20	2
Coating, painting, and spraying machine operators and tenders	940	.48	14	6
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	1,470	.75	26	3
Crushing, grinding, mixing, and blending machine operators and tenders	3,410	1.73	7	41
Packaging and filling machine operators and tenders	3,020	1.53	7	21
All other machine setters and set-up operators, except metal and plastic	350	.18	21	1
All other machine operators and tenders, except metal and plastic	480	.24	17	3
Other hand workers, nec	2,200	1.12	n.a.	n.a.
Welders and cutters	2,000	1.02	8	18
All other hand workers, nec	200	.10	n.a.	n.a.
Plant and system workers	26,550	13.48	n.a.	n.a.
Gas plant operators	1,190	.60	26	2
Chemical plant and system operators	1,810	.92	13	8
Petroleum pump system operators	3,380	1.72	11	12
Petroleum refinery and control panel operators	15,340	7.79	8	17
Gaugers	1,580	.80	11	8
Power distributors and dispatchers	720	.37	21	2
Stationary engineers	630	.32	16	3
All other plant and system operators	1,900	.96	16	7
Motor vehicle operators	5,210	2.65	n.a.	n.a.
Truck drivers, heavy or tractor trailer	4,160	2.11	7	36
Truck drivers, light, include delivery and route workers	850	.43	9	15
All other motor vehicle operators	200	.10	19	3
All other transportation and motor vehicle operators	100	.05	n.a.	n.a.
Material moving equipment operators	6,230	3.16	n.a.	n.a.
Tank car and truck loaders	1,250	.63	9	16
Oil pumpers, except well head	260	.13	32	1
Crane and tower operators	310	.16	15	5
Industrial truck and tractor operators	2,630	1.34	4	35
Conveyor operators and tenders	280	.14	26	2
Pump operators	1,150	.58	12	10
All other material moving equipment operators	350	.18	n.a.	n.a.
Helpers - mechanics and repairers	1,820	.92	12	7
Construction trades and extractive worker helpers	740	.38	16	4
Machine feeders and offbearers	840	.43	13	8
Freight, stock, and material movers, hand	1,640	.83	9	19
All other helpers, laborers, and material movers, hand	7,170	3.64	13	20

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Rubber and Miscellaneous Plastics Products

This industry includes establishments which manufacture tires, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries; establishments which engage in molding primary plastics for the trade; and those manufacturing miscellaneous finished plastics products. The industry employed 719,440 workers in 1983, or 4 percent of manufacturing and 9 percent of nondurable goods workers. Of the industry's employees, 68 percent worked in establishments molding primary plastics or fabricating miscellaneous finished plastics products. Establishments manufacturing tires and inner tubes employed 13 percent; establishments manufacturing industrial and mechanical rubber goods, together with rubberized fabric sundries employed 14 percent.

Unlike the majority of industries surveyed in 1983, aggregate employment in the rubber and miscellaneous plastics industry increased since 1980, growing by more than 18,000 (or 1 percent).

Staffing patterns changed markedly between surveys. The number of managerial and administrative workers declined by 11 percent between 1980 and 1983, while clerical staff declined by 6 percent. In line with other manufacturing industries, however, the employment of sales workers increased. Sales worker employment in the rubber and miscellaneous plastics industry increased by 3,600, or 33 percent. Employment since 1977 by occupational group is summarized in text table 10.

As shown in table 14, the industry's 553,380 production and related workers accounted for over three-fourths of total industry employment. Clerical workers, mostly office workers, ranked second with 9 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 6 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers about 2 percent; and service workers, about 1 percent.

The five most populous occupations in manufacturing rubber and miscellaneous plastics products are listed in the tabulation below. These jobs, all of which are in the production category, made up over one-fourth of total industry employment.

	Employment	*Percent of industry employment*
Plastic molding and casting machine operators and tenders	78,700	10.9
Assemblers and fabricators, except machine, electrical, electronic, and precision	53,130	7.4
First-line supervisors, production	35,140	4.9
Extruding, forming, pressing, and compacting machine operators and tenders	23,810	3.3
Plastic molding and casting machine setters and setup operators	21,810	3.0

Text table 10. Rubber and miscellaneous plastics products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	721,530	710,990	719,440	-0.3
Managerial and administrative workers	37,090	45,860	40,800	10.0
Professional, paraprofessional, and technical workers	33,330	41,070	36,000	8.0
Sales workers	10,870	11,020	[1]14,620	34.5
Clerical workers	60,890	67,470	63,640	4.5
Production and related workers	568,200	534,150	553,380	-2.6
Service workers	11,150	11,420	10,740	-3.7

[1] Includes 1,540 employees in the occupation "first-line supervisor—sales" and 720 employees in the sales engineer category; in previous surveys these workers would have been included in the managerial and professional categories.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 30)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	719,450	100.00	—	—
Managerial and administrative occupations	40,800	5.67	n.a.	n.a.
Financial managers	2,670	.37	14	20
Personnel, training, and labor relations managers	1,750	.24	8	18
Purchasing managers	1,230	.17	11	15
Marketing, advertising, and public relations managers	3,010	.42	15	14
Administrative services managers	1,260	.18	21	6
Industrial production managers	4,870	.68	7	23
General managers and top executives	20,820	2.89	2	87
All other managers and administrators	5,190	.72	11	15
Professional, paraprofessional, and technical occupations	36,030	5.01	n.a.	n.a.
Management support workers	10,110	1.41	n.a.	n.a.
Accountants, auditors, and other financial specialists	5,180	.72	n.a.	n.a.
Accountants and auditors	4,590	.64	9	31
Budget analysts	240	.03	14	2
All other financial specialists	350	.05	12	3
Purchasing agents, except wholesale and retail trade, and farm products	1,560	.22	4	17
Personnel, training, and labor relations specialists	980	.14	5	9
Cost estimators	710	.10	6	7
All other management support workers	1,680	.23	11	6
Engineers	11,280	1.57	n.a.	n.a.
Chemical engineers	2,610	.36	18	11
Electrical and electronic engineers	970	.13	20	5
Industrial engineers, except safety	2,040	.28	7	13
Safety engineers, except mining	390	.05	28	3
Mechanical engineers	4,020	.56	15	15
All other engineers	1,250	.17	15	4
Engineering and related technicians and technologists	5,100	.71	n.a.	n.a.
Electrical and electronic engineering technicians and technologists	570	.08	13	3
Industrial engineering technicians and technologists	550	.08	9	4
Mechanical engineering technicians and technologists	1,100	.15	14	4
Drafters	1,480	.21	6	11
All other engineering and related technicians and technologists	1,400	.19	9	4
Physical scientists	1,300	.18	n.a.	n.a.
Chemists, except biochemists	1,170	.16	12	6
All other physical scientists	130	.02	36	1
Physical and life science technicians and technologists	3,540	.49	n.a.	n.a.
Chemical technicians and technologists, except health	3,140	.44	6	10
All other physical and life science technicians and technologists	400	.06	15	1
Computer scientists and related workers	2,770	.39	n.a.	n.a.
Systems analysts, electronic data processing	1,000	.14	14	6
Computer programmers	1,400	.19	14	9
Computer programmer aides	370	.05	7	4
Health practitioners, technologists, technicians, and related health workers	360	.05	5	4
Designers, except interior designers	430	.06	10	3
All other professional, paraprofessional, and technical workers	1,140	.16	n.a.	n.a.

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 30)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sales and related occupations	14,610	2.03	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	1,540	.21	12	8
Sales engineers	720	.10	9	4
Sales representatives, scientific and related products and services, except retail	3,160	.44	6	12
Sales representatives, except scientific and related products or services and retail	8,050	1.12	4	31
All other sales and related workers	1,140	.16	8	5
Clerical and administrative support occupations	63,610	8.84	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,920	.27	6	13
Secretaries	12,190	1.69	3	64
Stenographers	1,150	.16	44	2
Receptionists and information clerks	870	.12	6	11
Typists	840	.12	8	5
Typists, word processing equipment	260	.04	13	2
Personnel clerks, except payroll and timekeeping	890	.12	4	11
File clerks	300	.04	9	3
Order clerks, materials, merchandise, and service	2,080	.29	5	11
Procurement clerks	670	.09	5	8
Bookkeeping, accounting, and auditing clerks	7,920	1.10	2	52
Payroll and timekeeping clerks	1,380	.19	3	16
Billing, cost and rate clerks	1,560	.22	6	12
General office clerks	7,840	1.09	3	42
Electronic data processing and other office machine operators	2,780	.39	n.a.	n.a.
Billing, posting, and calculating machine operators	240	.03	9	2
Computer operators, except peripheral equipment	850	.12	5	8
Data entry keyers, except composing	1,530	.21	6	10
All other office machine operators	160	.02	19	1
Switchboard operators	900	.13	3	13
Material recording, scheduling, dispatching, and distributing workers	19,110	2.66	n.a.	n.a.
Production, planning, and expediting clerks	3,400	.47	3	18
Weighers, measurers, checkers, and samplers, recordkeeping	660	.09	10	3
Stock clerks, stockroom, warehouse or storage yard	2,550	.35	4	14
Traffic, shipping, and receiving clerks	11,930	1.66	2	60
All other materials recording, scheduling, and distributing workers	570	.08	10	3
All other clerical and administrative support workers	950	.13	22	3
Service occupations	10,740	1.49	n.a.	n.a.
First-line supervisors and manager/supervisors, service	640	.09	11	3
Guards and watch guards	1,400	.19	6	5
Food and beverage preparation and service workers	190	.03	31	1
Cleaning and building service workers, except private households	8,090	1.12	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	7,810	1.09	4	40
All other cleaning and building service workers, except private households	280	.04	n.a.	n.a.
All other service workers	420	.06	n.a.	n.a.

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 30)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Agriculture, forestry, fishing, and related occupations	260	0.04	n.a.	n.a.
Gardeners and groundskeepers, except farm	260	.04	16	2
Production, construction, operating, maintenance, and material handling occupations	553,400	76.92	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	40,260	5.60	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	2,500	.35	4	14
First-line supervisors and manager/supervisors - construction trades and extractive workers	340	.05	41	1
First-line supervisors and manager/supervisors - production and operating workers	35,140	4.88	2	79
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	970	.13	5	7
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,310	.18	8	6
Precision inspectors, testers, and graders	8,220	1.14	4	23
Production inspectors, testers, graders, sorters, samplers, and weighers	21,030	2.92	5	32
Mechanics, installers, and repairers	30,550	4.25	n.a.	n.a.
Machinery maintenance mechanics	11,670	1.62	4	27
Millwrights	1,460	.20	14	2
Machinery maintenance workers	1,730	.24	7	6
Maintenance repairers, general utility	13,360	1.86	3	45
Automotive mechanics	210	.03	14	1
Bus and truck mechanics and diesel engine specialists	250	.03	12	1
Precision instrument repairers	910	.13	15	2
Mechanical control and valve installers and repairers	220	.03	31	[3]
All other mechanics, installers, and repairers	740	.10	17	2
Construction trades workers, except material moving	5,880	.82	n.a.	n.a.
Carpenters	420	.06	13	3
Electricians	3,580	.50	7	10
Painters and paperhangers, construction and maintenance	240	.03	12	2
Plumbers, pipefitters, and steamfitters	1,480	.21	11	2
All other construction trades workers	160	.02	30	1
Precision metal workers	15,720	2.19	n.a.	n.a.
Tool-and-die makers	4,340	.60	6	12
Machinists	10,020	1.39	5	28
Tool grinders, filers, sharpeners, and other precision grinders	380	.05	12	2
Sheet- metal workers	590	.08	19	1
All other precision metal workers	390	.05	24	1
Precision woodworkers	210	.03	32	1
Precision workers, nec	1,400	.19	n.a.	n.a.
Precision patternmakers, model makers, layout workers, and cutters	530	.07	29	1
All other precision workers, nec	870	.12	23	1
Machine setters, set-up operators, and tenders, metal and plastic	127,610	17.74	n.a.	n.a.
Punching machine setters and set-up operators, metal and plastic	1,460	.20	12	3

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 30)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Press and press brake machine setters and set-up operators, metal and plastic	1,520	0.21	16	2
Shear and slitter machine setters and set-up operators, metal and plastic	1,580	.22	12	3
Extruding and drawing machine setters and set-up operators, metal and plastic	5,770	.80	9	5
Rolling machine setters and set-up operators, metal and plastic	1,490	.21	21	1
Machine forming operators and tenders, metal and plastic	8,090	1.12	8	5
Numerical control machine tool operators and tenders, metal and plastic	440	.06	21	1
Combination machine tool setters and set-up operators, metal and plastic	890	.12	15	2
Combination machine tool operators and tenders, metal and plastic	1,210	.17	18	1
Plastic molding and casting machine setters and set-up operators	21,810	3.03	5	32
Plastic molding and casting machine operators and tenders	78,700	10.94	3	37
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	130	.02	27	(3)
Electrolytic plating and coating machine operators and tenders, metal and plastic	240	.03	25	(3)
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	120	.02	25	(3)
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	340	.05	39	(3)
Heating equipment setters and set-up operators, metal and plastic	120	.02	23	(3)
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	230	.03	37	(3)
Heaters, metal and plastic	650	.09	22	1
All other machine setters and set-up operators, metal and plastic	2,820	.39	13	3
All other machine operators and tenders, metal and plastic	6,570	.91	11	4
Machine setters, set-up operators, and tenders, except metal and plastic	136,940	19.03	n.a.	n.a.
Printing press machine setters and set-up operators	780	.11	15	2
Specialty materials printing machine setters and set-up operators	420	.06	31	1
Printing press machine operators and tenders	2,020	.28	12	2
All other printing, binding, and related machine operators and tenders	660	.09	23	1
Textile machine setters and set-up operators	480	.07	20	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	1,140	.16	18	2
Sewing machine operators, garment	1,000	.14	29	(3)
Sewing machine operators, nongarment	3,820	.53	14	5
Shoe sewing machine operators and tenders	5,160	.72	18	(3)
Tire building machine operators	13,570	1.89	9	2
Furnace, kiln, oven, drier, or kettle operators and tenders	4,420	.61	11	3
Boiler operators and tenders, low pressure	710	.10	11	3
Chemical equipment controllers and operators	930	.13	19	1
Chemical equipment tenders	430	.06	19	1

See footnotes at end of table.

Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 30)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Cutting and slicing machine setters and set-up operators	2,220	0.31	13	3
Cutting and slicing machine operators and tenders	7,560	1.05	5	14
Coating, painting, and spraying machine setters and set-up operators	3,420	.48	10	7
Coating, painting, and spraying machine operators and tenders	4,910	.68	8	8
Cementing and gluing machine operators and tenders	1,250	.17	14	2
Cleaning, washing, and pickling equipment operators and tenders	490	.07	19	1
Crushing, grinding, mixing, and blending machine operators and tenders	12,650	1.76	4	24
Extruding, forming, pressing, and compacting machine setters and set-up operators	11,270	1.57	6	15
Extruding, forming, pressing, and compacting machine operators and tenders	23,810	3.31	4	17
Packaging and filling machine operators and tenders	10,930	1.52	7	11
All other machine setters and set-up operators, except metal and plastic	3,390	.47	13	3
All other machine operators and tenders, except metal and plastic	12,930	1.80	7	7
Other hand workers, nec	78,030	10.85	n.a.	n.a.
Welders and cutters	850	.12	11	4
Solderers and brazers	140	.02	30	[3]
Cutters and trimmers, hand	6,670	.93	8	6
Molders and casters, hand	1,900	.26	12	2
Painting, coating, and decorating, workers, hand	3,600	.50	10	5
Assemblers and fabricators, except machine, electrical, electronic, and precision	53,130	7.38	3	33
All other hand workers, nec	11,740	1.63	8	7
Plant and system workers	2,330	.32	n.a.	n.a.
Chemical plant and system operators	1,010	.14	22	1
Stationary engineers	400	.06	10	1
All other plant and system operators	920	.13	23	1
Motor vehicle operators	3,750	.52	n.a.	n.a.
Truck drivers, heavy or tractor trailer	2,680	.37	6	10
Truck drivers, light, include delivery and route workers	1,070	.15	9	8
All other transportation and motor vehicle operators	950	.13	n.a.	n.a.
Material moving equipment operators	15,900	2.21	n.a.	n.a.
Industrial truck and tractor operators	14,430	2.01	4	25
Conveyor operators and tenders	820	.11	19	1
All other material moving equipment operators	650	.09	12	2
Helpers - mechanics and repairers	570	.08	13	2
Construction trades and extractive worker helpers	170	.02	23	[3]
Machine feeders and offbearers	14,310	1.99	6	13
Freight, stock, and material movers, hand	14,890	2.07	5	28
Hand packers and packagers	18,700	2.60	5	11
All other helpers, laborers, and material movers, hand	15,980	2.22	6	10

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Leather and Leather Products

Establishments which tan, curry, and finish hides and skins or manufacture finished leather and artificial leather products employed 205,540 workers in 1983, or only 1 percent of manufacturing and 3 percent of nondurable goods employment. Establishments manufacturing footwear (except rubber) employed 62 percent of industry workers, compared with 12 percent for establishments manufacturing handbags and other personal leather goods, and 9 percent for establishments engaged in tanning, currying, and finishing leather.

Total employment in the leather manufacturing industry declined by 13 percent between 1980 and 1983. The 166,650 production and related workers in the industry (table 15) accounted for over four-fifths of total industry employment. Clerical workers accounted for 10 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 4 percent; sales workers, 2 percent; professional, paraprofessional, and technical workers, 2 percent; and service workers, 1 percent.

The five most populous occupations in the industry, all production jobs, are listed in the tabulation below. These occupations made up more than one-third of total industry employment.

	Employment	*Percent of industry employment*
Shoe sewing machine operators and tenders	30,060	14.6
Shoe and leather workers and repairers, precision	25,910	12.6
Sewing machine operators, nongarment	10,410	5.1
Cementing and gluing machine operators and tenders	8,530	4.1
Assemblers and fabricators, except machine, electrical, electronic, and precision	8,140	4.0

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 31)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	205,550	100.00	—	—
Managerial and administrative occupations	8,130	3.96	n.a.	n.a.
Financial managers	520	.25	8	14
Personnel, training, and labor relations managers	310	.15	8	11
Purchasing managers	280	.14	7	11
Marketing, advertising, and public relations managers	480	.23	9	10
Administrative services managers	300	.15	16	6
Industrial production managers	1,250	.61	7	18
General managers and top executives	4,290	2.09	4	78
All other managers and administrators	700	.34	15	7
Professional, paraprofessional, and technical occupations	3,820	1.86	n.a.	n.a.
Management support workers	1,710	.83	n.a.	n.a.
Accountants, auditors, and other financial specialists	780	.38	n.a.	n.a.
Purchasing agents, except wholesale and retail trade, and farm products	360	.18	8	12
Personnel, training, and labor relations specialists	130	.06	11	4
Cost estimators	140	.07	10	4
All other management support workers	300	.15	19	3
Engineers	530	.26	n.a.	n.a.
Industrial engineers, except safety	300	.15	9	9
Mechanical engineers	80	.04	12	2
All other engineers	150	.07	n.a.	n.a.
Engineering and related technicians and technologists	260	.13	n.a.	n.a.
Industrial engineering technicians and technologists	130	.06	12	4
All other engineering and related technicians and technologists	130	.06	n.a.	n.a.
Physical and life science technicians and technologists	60	.03	n.a.	n.a.
Computer scientists and related workers	630	.31	n.a.	n.a.
Systems analysts, electronic data processing	190	.09	18	4
Computer programmers	300	.15	12	6
All other computer systems analysts, programmers, and programmer aides	140	.07	n.a.	n.a.
Designers, except interior designers	420	.20	12	7
All other professional, paraprofessional, and technical workers	210	.10	n.a.	n.a.
Sales and related occupations	4,680	2.28	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	480	.23	17	7
Sales representatives, scientific and related products and services, except retail	540	.26	15	6
Sales representatives, except scientific and related products or services and retail	2,960	1.44	11	25
All other sales and related workers	700	.34	n.a.	n.a.
Clerical and administrative support occupations	19,780	9.62	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,050	.51	13	15
Secretaries	2,080	1.01	6	44
Stenographers	140	.07	37	2
Receptionists and information clerks	230	.11	6	10
Typists	310	.15	26	5
Typists, word processing equipment	130	.06	25	1

See footnotes at end of table.

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 31)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Personnel clerks, except payroll and timekeeping	210	0.10	7	8
File clerks	190	.09	14	4
Order clerks, materials, merchandise, and service	840	.41	12	10
Procurement clerks	220	.11	11	6
Statistical clerks	60	.03	15	2
Bookkeeping, accounting, and auditing clerks	1,990	.97	5	49
Payroll and timekeeping clerks	850	.41	4	19
Billing, cost and rate clerks	550	.27	12	10
General office clerks	2,950	1.44	9	39
Electronic data processing and other office machine operators	1,200	.58	n.a.	n.a.
Billing, posting, and calculating machine operators	140	.07	17	3
Computer operators, except peripheral equipment	330	.16	12	6
Data entry keyers, except composing	570	.28	16	7
All other office machine operators	160	.08	n.a.	n.a.
Switchboard operators	260	.13	5	11
Material recording, scheduling, dispatching, and distributing workers	6,240	3.04	n.a.	n.a.
Production, planning, and expediting clerks	580	.28	8	11
Weighers, measurers, checkers, and samplers, recordkeeping	110	.05	18	2
Marking clerks	100	.05	19	2
Stock clerks, stockroom, warehouse or storage yard	1,320	.64	19	12
Traffic, shipping, and receiving clerks	3,640	1.77	4	56
All other material recording, scheduling, and distributing workers	490	.24	25	3
All other clerical and administrative support workers	280	.14	n.a.	n.a.
Service occupations	2,440	1.19	n.a.	n.a.
First-line supervisors and manager/supervisors, service	220	.11	16	3
Guards and watch guards	370	.18	8	6
Cleaning and building service workers, except private households	1,760	.86	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	1,580	.77	3	38
Elevator operators	70	.03	13	2
All other cleaning and building service workers, except private households	110	.05	15	2
All other service workers	90	.04	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations	40	.02	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations	166,660	81.08	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	6,380	3.10	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	190	.09	8	7
First-line supervisors and manager/supervisors - production and operating workers	5,600	2.72	3	64
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	100	.05	16	2

See footnotes at end of table.

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 31)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	490	0.24	13	5
Precision inspectors, testers, and graders	260	.13	21	2
Production inspectors, testers, graders, sorters, samplers, and weighers	4,100	1.99	4	33
Mechanics, installers, and repairers	3,490	1.70	n.a.	n.a.
Machinery maintenance mechanics	1,220	.59	n.a.	n.a.
Machinery maintenance mechanics, textile machines	140	.07	20	2
Machinery maintenance mechanics, sewing machines	700	.34	4	15
All other machinery maintenance mechanics	380	.18	n.a.	n.a.
Millwrights	60	.03	31	1
Machinery maintenance workers	160	.08	14	3
Maintenance repairers, general utility	1,820	.89	4	33
Menders - garments, linens, and related	90	.04	23	1
All other mechanics, installers, and repairers	140	.07	n.a.	n.a.
Construction trades workers, except material moving	310	.15	n.a.	n.a.
Carpenters	120	.06	13	3
Electricians	120	.06	8	4
All other construction trades workers	70	.03	n.a.	n.a.
Precision metal workers	490	.24	n.a.	n.a.
Tool grinders, filers, sharpeners, and other precision grinders	60	.03	28	1
All other precision metal workers	430	.21	n.a.	n.a.
Precision woodworkers	100	.05	26	1
Precision textile, apparel, and furnishings workers	26,950	13.11	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers	340	.17	16	5
Custom tailors and sewers	90	.04	47	1
Shoe and leather workers and repairers, precision	25,910	12.61	6	36
Precision dyers	200	.10	28	2
All other precision textile, apparel, and furnishings workers	410	.20	n.a.	n.a.
Precision workers, nec	500	.24	n.a.	n.a.
Machine setters, set-up operators, and tenders, metal and plastic	1,600	.78	n.a.	n.a.
Plastic molding and casting machine operators and tenders	510	.25	20	2
All other machine setters and set-up operators, metal and plastic	1,090	.53	n.a.	n.a.
All other machine operators and tenders, metal and plastic	320	.16	24	1
Machine setters, set-up operators, and tenders, except metal and plastic	73,390	35.70	n.a.	n.a.
Specialty materials printing machine setters and set-up operators	60	.03	19	1
Screen printing machine setters and set-up operators	70	.03	25	1
All other printing related setters and set-up operators	60	.03	20	1
Printing press machine operators and tenders	170	.08	30	2
Textile machine setters and set-up operators	80	.04	27	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	710	.35	18	2
Extruding and forming machine operators and tenders, synthetic or glass fibers	70	.03	31	1
Textile bleaching and dyeing machine operators and tenders	110	.05	30	1
Sewing machine operators, garment	2,860	1.39	16	4
Sewing machine operators, nongarment	10,410	5.06	4	32

See footnotes at end of table.

Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 31)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Shoe sewing machine operators and tenders	30,060	14.62	3	29
Laundry and drycleaning machine operators and tenders, except pressing	100	.05	45	[3]
Pressing machine operators and tenders, textile, garment, and related materials	1,470	.72	23	5
Furnace, kiln, oven, drier, or kettle operators and tenders	160	.08	32	1
Boiler operators and tenders, low pressure	60	.03	17	1
Cutting and slicing machine setters and set-up operators	3,590	1.75	6	24
Cutting and slicing machine operators and tenders	3,380	1.64	7	20
Coating, painting, and spraying machine setters and set-up operators	380	.18	14	3
Coating, painting, and spraying machine operators and tenders	930	.45	10	6
Cementing and gluing machine operators and tenders	8,530	4.15	6	34
Cleaning, washing, and pickling equipment operators and tenders	370	.18	21	2
Crushing, grinding, mixing, and blending machine operators and tenders	550	.27	14	3
Extruding, forming, pressing, and compacting machine setters and set-up operators	100	.05	37	1
Extruding, forming, pressing, and compacting machine operators and tenders	590	.29	20	2
Packaging and filling machine operators and tenders	1,690	.82	8	13
All other machine setters and set-up operators, except metal and plastic	1,450	.71	16	3
All other machine operators and tenders, except metal and plastic	5,060	2.46	n.a.	n.a.
Other hand workers, nec	25,980	12.64	n.a.	n.a.
Pressers, hand	160	.08	18	2
Sewers, hand	3,960	1.93	11	12
Cutters and trimmers, hand	4,550	2.21	5	33
Portable machine cutters	500	.24	15	3
Painting, coating, and decorating, workers, hand	350	.17	14	4
Assemblers and fabricators, except machine, electrical, electronic, and precision	8,140	3.96	7	15
All other hand workers, nec	8,320	4.05	7	15
Motor vehicle operators	270	.13	n.a.	n.a.
Truck drivers, heavy or tractor trailer	270	.13	11	5
All other transportation and motor vehicle operators	290	.14	n.a.	n.a.
Material moving equipment operators	910	.44	n.a.	n.a.
Industrial truck and tractor operators	440	.21	10	6
Conveyor operators and tenders	250	.12	12	4
All other material moving equipment operators	220	.11	41	1
Helpers - mechanics and repairers	140	.07	15	2
Machine feeders and offbearers	3,110	1.51	7	15
Freight, stock, and material movers, hand	3,830	1.86	6	29
Hand packers and packagers	3,390	1.65	8	15
All other helpers, laborers, and material movers, hand	11,110	5.41	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations	60	.03	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.
n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Stone, Clay, Glass, and Concrete Products

Establishments manufacturing products of glass, cement, structural clay, pottery, concrete and gypsum, cut stone, abrasives, asbestos, and miscellaneous nonmetallic minerals employed 570,300 workers, accounting for 3 percent of manufacturing and 5 percent of durable goods employment in 1981. Establishments producing concrete, gypsum, and plaster products employed 33 percent; establishments manufacturing abrasive, asbestos, and miscellaneous nonmetallic mineral products employed 19 percent; and establishments producing pressed or blown glass and glassware employed 18 percent.

Total employment in the stone, clay, glass, and concrete products industry declined by 14 percent from the 1980 level. As shown in table 16, the 433,220 production and related workers in this industry accounted for three-fourths of total industry employment. Clerical workers ranked second with 9 percent. Most of these were office clerical workers. The remaining employment was distributed as follows: Managerial and administrative workers, 6 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers, 3 percent: and service workers, 1 percent.

The five most populous occupations in the manufacture of stone, clay, glass, and concrete products are listed in the tabulation below:

	Employment	*Percent of industry employment*
Truckdrivers, heavy or tractor trailer	56,200	9.8
First-line supervisors, production	23,200	4.1
General managers and top executives	19,280	3.4
Industrial truck and tractor operators	18,420	3.2
Maintenance repairers, general utility	15,370	2.7

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 32)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	570,270	100.00	—	—
Managerial and administrative occupations	33,880	5.94	n.a.	n.a.
Financial managers	1,880	.33	9	9
Personnel, training, and labor relations managers	1,280	.22	6	8
Purchasing managers	670	.12	4	6
Marketing, advertising, and public relations managers	1,770	.31	14	5
Administrative services managers	710	.12	8	3
Industrial production managers	3,480	.61	6	10
Mining, quarrying, and oil and gas well drilling managers	250	.04	8	2
General managers and top executives	19,280	3.38	1	77
All other managers and administrators	4,560	.80	15	6
Professional, paraprofessional, and technical occupations	26,750	4.69	n.a.	n.a.
Management support workers	7,960	1.40	n.a.	n.a.
Accountants, auditors, and other financial specialists	4,110	.72	n.a.	n.a.
Accountants and auditors	3,480	.61	5	18
Budget analysts	280	.05	15	1
All other financial specialists	350	.06	19	1
Purchasing agents, except wholesale and retail trade, and farm products	1,160	.20	4	8
Personnel, training, and labor relations specialists	850	.15	6	5
Cost estimators	440	.08	6	2
All other management support workers	1,400	.25	16	2
Engineers	6,950	1.22	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	570	.10	6	2
Chemical engineers	720	.13	14	2
Civil engineers, including traffic	480	.08	9	2
Electrical and electronic engineers	740	.13	9	3
Industrial engineers, except safety	1,440	.25	7	6
Mechanical engineers	1,940	.34	8	6
All other engineers	1,060	.19	12	2
Engineering and related technicians and technologists	4,730	.83	n.a.	n.a.
Civil engineering technicians and technologists	80	.01	14	1
Electrical and electronic engineering technicians and technologists	520	.09	9	2
Industrial engineering technicians and technologists	360	.06	10	2
Mechanical engineering technicians and technologists	510	.09	10	1
Drafters	2,350	.41	4	9
All other engineering and related technicians and technologists	910	.16	12	2
Physical scientists	1,050	.18	n.a.	n.a.
Chemists, except biochemists	930	.16	7	4
All other physical scientists	120	.02	28	[3]
Physical and life science technicians and technologists	2,090	.37	n.a.	n.a.
Chemical technicians and technolcgists, except health	1,630	.29	5	3
All other physical and life science technicians and technologists	460	.08	28	1
Computer scientists and related workers	2,230	.39	n.a.	n.a.
Systems analysts, electronic data processing	1,020	.18	17	3
Computer programmers	900	.16	10	4
Computer programmer aides	230	.04	8	1

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 32)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control	80	0.01	12	(3)
Health practitioners, technologists, technicians, and related health workers	360	.06	5	3
Designers, except interior designers	500	.09	8	2
All other professional, paraprofessional, and technical workers	880	.15	n.a.	n.a.
Sales and related occupations	15,110	2.65	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	1,010	.18	7	4
Sales engineers	480	.08	10	1
Sales representatives, scientific and related products and services, except retail	4,020	.70	8	11
Sales representatives, except scientific and related products or services and retail	8,500	1.49	2	28
All other sales and related workers	1,100	.19	8	3
Clerical and administrative support occupations	53,690	9.41	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,820	.32	9	6
Secretaries	10,960	1.92	5	45
Stenographers	290	.05	17	1
Receptionists and information clerks	390	.07	4	4
Typists	650	.11	6	3
Typists, word processing equipment	250	.04	13	1
Personnel clerks, except payroll and timekeeping	660	.12	7	5
File clerks	290	.05	11	1
Order clerks, materials, merchandise, and service	1,300	.23	6	5
Procurement clerks	460	.08	6	3
Bookkeeping, accounting, and auditing clerks	9,180	1.61	2	48
Payroll and timekeeping clerks	1,560	.27	5	10
Billing, cost and rate clerks	1,340	.23	6	6
General office clerks	7,350	1.29	2	34
Electronic data processing and other office machine operators	2,040	.36	n.a.	n.a.
Billing, posting, and calculating machine operators	240	.04	12	1
Computer operators, except peripheral equipment	760	.13	8	4
Data entry keyers, except composing	920	.16	6	4
All other office machine operators	120	.02	26	(3)
Switchboard operators	720	.13	3	7
Material recording, scheduling, dispatching, and distributing workers	13,770	2.41	n.a.	n.a.
Dispatchers, except police, fire, and ambulance	4,580	.80	2	24
Production, planning, and expediting clerks	1,940	.34	4	7
Weighers, measurers, checkers, and samplers, recordkeeping	560	.10	7	2
Stock clerks, stockroom, warehouse or storage yard	1,940	.34	4	8
Traffic, shipping, and receiving clerks	4,400	.77	3	18
All other material recording, scheduling, and distributing workers	350	.06	13	1
All other clerical and administrative support workers	660	.12	17	1
Service occupations	7,400	1.30	n.a.	n.a.
First-line supervisors and manager/supervisors, service	500	.09	11	1
Guards and watch guards	1,360	.24	4	4

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 32)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Food and beverage preparation and service workers	90	0.02	19	([3])
Cleaning and building service workers, except private households	5,270	.92	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	4,930	.86	3	20
All other cleaning and building service workers, except private households	340	.06	12	1
All other service workers	180	.03	18	([3])
Agriculture, forestry, fishing, and related occupations	220	.04	n.a.	n.a.
Gardeners and groundskeepers, except farm	220	.04	12	1
Production, construction, operating, maintenance, and material handling occupations	433,220	75.97	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	28,650	5.02	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	2,000	.35	3	7
First-line supervisors and manager/supervisors - construction trades and extractive workers	520	.09	17	1
First-line supervisors and manager/supervisors - production and operating workers	23,200	4.07	1	58
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	1,470	.26	5	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	1,460	.26	6	4
Precision inspectors, testers, and graders	3,630	.64	9	4
Production inspectors, testers, graders, sorters, samplers, and weighers	22,580	3.96	4	14
Mechanics, installers, and repairers	37,860	6.64	n.a.	n.a.
Machinery maintenance mechanics	10,290	1.80	3	18
Millwrights	1,580	.28	9	1
Refractory materials repairers, except brick masons	400	.07	9	2
Machinery maintenance workers	1,760	.31	6	5
Maintenance repairers, general utility	15,370	2.70	2	33
Automotive mechanics	3,390	.59	3	15
Bus and truck mechanics and diesel engine specialists	2,430	.43	5	6
Mobile heavy equipment mechanics, except engines	770	.14	7	2
Precision instrument repairers	870	.15	7	2
Riggers	210	.04	15	1
All other mechanics, installers, and repairers	790	.14	9	2
Construction trades workers, except material moving	12,430	2.18	n.a.	n.a.
Carpenters	940	.16	7	3
Electricians	3,660	.64	3	8
Brickmasons	290	.05	14	1
Concrete and terrazzo finishers	4,210	.74	7	7
Painters and paperhangers, construction and maintenance	400	.07	14	2
Plumbers, pipefitters, and steamfitters	640	.11	9	1
Paving, surfacing, and tamping equipment operators	240	.04	37	([3])
All other construction trades workers	2,050	.36	13	2

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 32)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Extractive and related workers, including blasters	1,070	0.19	10	2
Precision metal workers	6,340	1.11	n.a.	n.a.
Tool-and-die makers	1,460	.26	8	2
Machinists	3,640	.64	5	8
Tool grinders, filers, sharpeners, and other precision grinders	470	.08	15	1
Sheet- metal workers	350	.06	15	1
All other precision metal workers	420	.07	23	(*)
Precision workers, nec	12,580	2.21	n.a.	n.a.
Precision molders, shapers, casters, and carvers, except jewelry and foundry	8,950	1.57	5	9
Precision patternmakers, model makers, layout workers, and cutters	1,050	.18	9	2
Precision detail design decorators, and painters	990	.17	13	1
All other precision workers, nec	1,590	.28	21	1
Machine setters, set-up operators, and tenders, metal and plastic	12,230	2.14	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	330	.06	13	1
Lathe and turning machine tool setters and set-up operators, metal and plastic	1,040	.18	9	2
Drilling and boring machine tool setters and set-up operators, metal and plastic	970	.17	16	1
Milling and planing machine setters and set-up operators, metal and plastic	240	.04	21	(*)
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	1,400	.25	11	2
Machine tool cutting operators and tenders, metal and plastic	2,180	.38	9	3
Punching machine setters and set-up operators, metal and plastic	1,200	.21	16	1
Press and press brake machine setters and set-up operators, metal and plastic	850	.15	26	1
Machine forming operators and tenders, metal and plastic	2,130	.37	10	1
Combination machine tool setters and set-up operators, metal and plastic	930	.16	13	1
Combination machine tool operators and tenders, metal and plastic	540	.09	18	1
All other machine setters and set-up operators, metal and plastic	420	.07	23	(*)
All other machine operators and tenders, metal and plastic	950	.17	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic	78,520	13.77	n.a.	n.a.
Screen printing machine setters and set-up operators	960	.17	10	2
All other printing related setters and set-up operators	60	.01	25	(*)
Printing press machine operators and tenders	310	.05	24	(*)
All other printing, binding, and related machine operators and tenders	70	.01	24	(*)
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting	1,760	.31	22	(*)
Extruding and forming machine operators and tenders, synthetic or glass fibers	4,080	.72	20	(*)
Furnace, kiln, oven, drier, or kettle operators and tenders	12,550	2.20	3	17
Cutting and slicing machine setters and set-up operators	3,130	.55	5	5
Cutting and slicing machine operators and tenders	3,920	.69	6	6
Coating, painting, and spraying machine setters and set-up operators	1,920	.34	8	4

See footnotes at end of table.

Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 32)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Coating, painting, and spraying machine operators and tenders	1,800	0.32	8	3
Cleaning, washing, and pickling equipment operators and tenders	620	.11	11	1
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	370	.06	11	1
Crushing, grinding, mixing, and blending machine operators and tenders	11,560	2.03	3	19
Extruding, forming, pressing, and compacting machine setters and set-up operators	8,760	1.54	4	8
Extruding, forming, pressing, and compacting machine operators and tenders	9,440	1.66	4	10
Packaging and filling machine operators and tenders	8,130	1.43	5	8
All other machine setters and set-up operators, except metal and plastic	2,330	.41	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	5,800	1.02	7	3
Other hand workers, nec	37,820	6.63	n.a.	n.a.
Glaziers, manufacturing	500	.09	19	1
Welders and cutters	5,220	.92	5	13
Solderers and brazers	780	.14	13	1
Cutters and trimmers, hand	2,890	.51	5	5
Molders and casters, hand	7,540	1.32	5	9
Painting, coating, and decorating, workers, hand	2,650	.46	7	4
Grinding and polishing workers, hand	5,130	.90	5	7
Assemblers and fabricators, except machine, electrical, electronic, and precision	10,600	1.86	6	5
All other hand workers, nec	2,510	.44	8	3
Plant and system workers	3,420	.60	n.a.	n.a.
Stationary engineers	430	.08	10	1
All other plant and system operators	2,990	.52	13	5
Motor vehicle operators	62,130	10.89	n.a.	n.a.
Truck drivers, heavy or tractor trailer	56,200	9.85	2	55
Truck drivers, light, include delivery and route workers	5,270	.92	6	12
All other motor vehicle operators	660	.12	19	1
All other transportation and motor vehicle operators	280	.05	16	[3]
Material moving equipment operators	30,070	5.27	n.a.	n.a.
Dragline operators	240	.04	14	1
Dredge operators and dipper tenders	70	.01	19	[3]
Grader, dozer, and scraper operators	1,360	.24	6	4
Hoist and winch operators	750	.13	8	3
Crane and tower operators	2,130	.37	4	8
Industrial truck and tractor operators	18,420	3.23	2	35
Conveyor operators and tenders	3,250	.57	6	10
Pump operators	230	.04	11	1
Operating engineers	2,770	.49	7	6
All other material moving equipment operators	850	.15	20	1
Helpers - mechanics and repairers	1,570	.28	11	2
Construction trades and extractive worker helpers	760	.13	15	1
Machine feeders and offbearers	15,130	2.65	4	15
Freight, stock, and material movers, hand	12,330	2.16	3	20
Hand packers and packagers	15,360	2.69	6	5
All other helpers, laborers, and material movers, hand	38,460	6.74	3	17

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Primary Metal Products

Establishments which manufacture primary metal products employed 828,000 workers in 1983, or 4.5 percent of manufacturing and 8 percent of durable goods employment. Of these workers, blast furnaces, steel works, and rolling and finishing mills employed 41 percent; establishments engaged in rolling, drawing, and extruding nonferrous metals employed 22 percent; and iron and steel foundries, 17 percent.

The primary metal products industry suffered the largest absolute and relative decreases in employment of any manufacturing industry between 1980 and 1983. Total employment fell from 1.2 million in 1980 to 828,000 in 1983, a decline of 31 percent.

The occupational staffing mix also changed somewhat between 1980 and 1983. The proportion of production jobs fell from 79 to 76 percent, and managerial and professional jobs increased as a percentage of total employment. Changes since 1977 are summarized in text table 11.

As shown in table 17, the primary metal products industry employed 633,000 production and related workers, who accounted for 76 percent of total industry employment. Clerical workers ranked second with 9 percent. The remaining employment was distributed as follows: Professional, paraprofessional, and technical workers, 7 percent; managerial and administrative workers, 4 percent; service workers, 2 percent; and sales workers, 1 percent.

The five most populous occupations in manufacturing parmary metal products are listed below:

	Employment	*Percent of industry employment*
First-line supervisors, production	38,160	4.6
Machinery maintenance mechanics	20,040	2.4
Industrial truck and tractor operators	19,550	2.4
Crane and tower operators	19,150	2.3
Production inspectors, testers, graders, sorters, samplers, and weighers	18,250	2.2

Text table 11. Primary metal products: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,180,940	1,205,100	827,560	-29.9
Managerial and administrative workers	43,460	47,550	36,630	-15.7
Professional, paraprofessional, and technical workers	61,390	68,670	54,920	-10.5
Sales workers	8,540	10,680	[1]12,370	44.9
Clerical workers	98,660	98,230	74,110	-24.9
Production and related workers	945,010	956,430	632,910	-33.0
Service workers	23,880	23,540	16,360	-31.5

[1] Includes 1,570 employees in the occupation "first-line supervisor—sales" and 1,050 employees in the sales engineer category; in previous surveys these workers would have been included in the managerial and professional categories.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	827,540	100.00	—	—
Managerial and administrative occupations	36,630	4.43	n.a.	n.a.
Financial managers	2,960	.36	5	24
Personnel, training, and labor relations managers	2,270	.27	4	23
Purchasing managers	1,210	.15	3	17
Marketing, advertising, and public relations managers	2,540	.31	5	17
Administrative services managers	1,040	.13	9	7
Industrial production managers	6,620	.80	6	26
General managers and top executives	13,710	1.66	2	84
All other managers and administrators	6,260	.76	10	18
Professional, paraprofessional, and technical occupations	54,930	6.64	n.a.	n.a.
Management support workers	14,790	1.79	n.a.	n.a.
Accountants, auditors, and other financial specialists	6,240	.75	n.a.	n.a.
Accountants and auditors	4,860	.59	5	29
Budget analysts	730	.09	18	5
All other financial specialists	650	.08	12	3
Purchasing agents, except wholesale and retail trade, and farm products	2,860	.35	3	32
Personnel, training, and labor relations specialists	1,960	.24	8	12
Cost estimators	1,060	.13	7	8
All other management support workers	2,670	.32	25	7
Engineers	17,450	2.11	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	4,180	.51	8	23
Chemical engineers	490	.06	12	3
Civil engineers, including traffic	460	.06	12	3
Electrical and electronic engineers	1,810	.22	7	9
Industrial engineers, except safety	3,120	.38	6	16
Safety engineers, except mining	650	.08	9	6
Mechanical engineers	3,900	.47	5	18
All other engineers	2,840	.34	n.a.	n.a.
Engineering and related technicians and technologists	9,570	1.16	n.a.	n.a.
Civil engineering technicians and technologists	150	.02	45	1
Electrical and electronic engineering technicians and technologists	1,320	.16	9	6
Industrial engineering technicians and technologists	960	.12	10	5
Mechanical engineering technicians and technologists	660	.08	8	4
Drafters	2,770	.33	6	15
All other engineering and related technicians and technologists	3,710	.45	7	9
Physical scientists	1,710	.21	n.a.	n.a.
Chemists, except biochemists	1,400	.17	6	9
All other physical scientists	310	.04	15	2
Physical and life science technicians and technologists	3,220	.39	n.a.	n.a.
Chemical technicians and technologists, except health	2,740	.33	7	8
All other physical and life science technicians and technologists	480	.06	21	2
Computer scientists and related workers	4,490	.54	n.a.	n.a.
Systems analysts, electronic data processing	2,090	.25	10	9
Computer programmers	1,770	.21	10	11
Computer programmer aides	430	.05	8	4

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control	200	0.02	15	2
Mathematical scientists and related workers	320	.04	n.a.	n.a.
Operations and systems researchers and analysts, except computer	320	.04	25	1
Health practitioners, technologists, technicians, and related health workers	1,360	.16	6	10
All other professional, paraprofessional, and technical workers	2,020	.24	n.a.	n.a.
Sales and related occupations	12,360	1.49	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	1,570	.19	7	9
Sales engineers	1,050	.13	8	5
Sales representatives, scientific and related products and services, except retail	4,100	.50	10	19
Sales representatives, except scientific and related products or services and retail	4,630	.56	4	22
All other sales and related workers	1,010	.12	13	5
Clerical and administrative support occupations	74,090	8.95	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	3,270	.40	6	15
Secretaries	11,130	1.34	4	62
Stenographers	1,170	.14	10	4
Receptionists and information clerks	710	.09	5	10
Typists	1,980	.24	6	11
Typists, word processing equipment	620	.07	10	4
Personnel clerks, except payroll and timekeeping	1,400	.17	7	13
File clerks	640	.08	13	4
Order clerks, materials, merchandise, and service	1,960	.24	8	10
Procurement clerks	950	.11	5	10
Statistical clerks	960	.12	13	3
Bookkeeping, accounting, and auditing clerks	6,980	.84	4	50
Payroll and timekeeping clerks	2,460	.30	4	20
Billing, cost and rate clerks	1,960	.24	5	14
General office clerks	7,330	.89	5	38
Electronic data processing and other office machine operators	4,150	.50	n.a.	n.a.
Billing, posting, and calculating machine operators	410	.05	11	3
Computer operators, except peripheral equipment	1,340	.16	7	10
Peripheral EDP equipment operators	170	.02	17	1
Data entry keyers, except composing	1,830	.22	6	11
All other office machine operators	400	.05	21	2
Switchboard operators	1,000	.12	5	14
Material recording, scheduling, dispatching, and distributing workers	22,840	2.76	n.a.	n.a.
Production, planning, and expediting clerks	6,890	.83	6	22
Weighers, measurers, checkers, and samplers, recordkeeping	2,830	.34	9	9
Stock clerks, stockroom, warehouse or storage yard	4,060	.49	4	18
Traffic, shipping, and receiving clerks	8,100	.98	4	48
All other material recording, scheduling, and distributing workers	960	.12	9	4
All other clerical and administrative support workers	2,580	.31	12	5
Service occupations	16,350	1.98	n.a.	n.a.

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, service	1,240	0.15	8	7
Guards and watch guards	5,300	.64	6	13
Food and beverage preparation and service workers	240	.03	17	1
Cleaning and building service workers, except private households	9,130	1.10	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	8,350	1.01	5	39
All other cleaning and building service workers, except private households	780	.09	21	2
All other service workers	440	.05	22	2
Agriculture, forestry, fishing, and related occupations	250	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm	250	.03	9	2
Production, construction, operating, maintenance, and material handling occupations	632,930	76.48	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	55,720	6.73	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	9,280	1.12	10	20
First-line supervisors and manager/supervisors - construction trades and extractive workers	1,720	.21	12	4
First-line supervisors and manager/supervisors - production and operating workers	38,160	4.61	3	74
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	3,170	.38	16	9
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	3,390	.41	13	8
Precision inspectors, testers, and graders	9,690	1.17	8	25
Production inspectors, testers, graders, sorters, samplers, and weighers	18,250	2.21	6	31
Mechanics, installers, and repairers	72,790	8.80	n.a.	n.a.
Machinery maintenance mechanics	20,040	2.42	10	22
Millwrights	16,630	2.01	13	7
Refractory materials repairers, except brick masons	2,650	.32	11	6
Machinery maintenance workers	3,750	.45	10	12
Maintenance repairers, general utility	16,630	2.01	4	49
Automotive mechanics	1,440	.17	14	4
Bus and truck mechanics and diesel engine specialists	2,280	.28	13	5
Precision instrument repairers	3,150	.38	13	5
Riggers	2,490	.30	20	1
All other mechanics, installers, and repairers	3,730	.45	18	4
Construction trades workers, except material moving	29,390	3.55	n.a.	n.a.
Carpenters	2,220	.27	8	9
Electricians	15,830	1.91	6	23
Brickmasons	2,320	.28	11	4
Painters and paperhangers, construction and maintenance	1,100	.13	8	6
Plumbers, pipefitters, and steamfitters	6,680	.81	9	6
All other construction trades workers	1,240	.15	20	2
Extractive and related workers, including blasters	170	.02	24	1
Precision metal workers	30,560	3.69	n.a.	n.a.

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Tool-and-die makers	5,630	0.68	8	15
Machinists	12,920	1.56	6	23
Tool grinders, filers, sharpeners, and other precision grinders	3,940	.48	6	12
Pattern and model makers, metal	2,540	.31	7	11
Precision layout workers, metal	980	.12	16	3
Sheet- metal workers	1,470	.18	17	3
Boilermakers	2,220	.27	18	1
All other precision metal workers	860	.10	34	1
Precision woodworkers	1,500	.18	n.a.	n.a.
Pattern and model makers, wood	1,280	.15	9	5
All other precision woodworkers	220	.03	26	1
Precision workers, nec	14,090	1.70	n.a.	n.a.
Precision foundry mold and core makers	13,210	1.60	3	26
All other precision workers, nec	880	.11	15	2
Machine setters, set-up operators, and tenders, metal and plastic	153,200	18.51	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	2,320	.28	8	5
Lathe and turning machine tool setters and set-up operators, metal and plastic	2,820	.34	11	7
Drilling and boring machine tool setters and set-up operators, metal and plastic	1,480	.18	7	6
Milling and planing machine setters and set-up operators, metal and plastic	680	.08	15	2
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	7,340	.89	5	17
Machine tool cutting operators and tenders, metal and plastic	9,470	1.14	9	11
Punching machine setters and set-up operators, metal and plastic	2,400	.29	7	8
Press and press brake machine setters and set-up operators, metal and plastic	2,660	.32	7	7
Shear and slitter machine setters and set-up operators, metal and plastic	4,880	.59	8	6
Extruding and drawing machine setters and set-up operators, metal and plastic	17,590	2.13	5	16
Rolling machine setters and set-up operators, metal and plastic	9,450	1.14	8	10
Forging machine setters and set-up operators, metal and plastic	1,200	.15	17	2
Machine forming operators and tenders, metal and plastic	16,090	1.94	8	8
Numerical control machine tool operators and tenders, metal and plastic	1,000	.12	15	2
Combination machine tool setters and set-up operators, metal and plastic	1,410	.17	12	3
Combination machine tool operators and tenders, metal and plastic	2,010	.24	10	3
Welding machine setters and set-up operators	1,730	.21	17	3
Welding machine operators and tenders	930	.11	18	2
Soldering and brazing machine setters and set-up operators	200	.02	27	(3)
Soldering and brazing machine operators and tenders	170	.02	41	(3)
Metal molding, coremaking, and casting machine setters and set-up operators	8,560	1.03	4	18
Metal molding, coremaking, and casting machine operators and tenders	11,740	1.42	7	13
Foundry mold assembly and shakeout workers	5,630	.68	6	8
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	980	.11	14	2
Electrolytic plating and coating machine operators and tenders, metal and plastic	1,190	.14	13	2

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	1,010	0.12	17	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	380	.05	20	1
Heating equipment setters and set-up operators, metal and plastic	2,890	.35	7	10
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	9,630	1.16	4	20
Furnace operators and tenders	17,250	2.08	5	42
Heaters, metal and plastic	3,060	.37	10	4
All other machine setters and set-up operators, metal and plastic	5,150	.62	11	4
All other machine operators and tenders, metal and plastic	11,170	1.35	9	7
Machine setters, set-up operators, and tenders, except metal and plastic	41,880	5.06	n.a.	n.a.
Boiler operators and tenders, low pressure	1,380	.17	14	3
Coating, painting, and spraying machine setters and set-up operators	1,540	.19	12	3
Coating, painting, and spraying machine operators and tenders	1,750	.21	17	3
Cleaning, washing, and pickling equipment operators and tenders	1,830	.22	12	5
Separating, filtering, clarifying, precipitating, and still machine operators and tenders	1,520	.18	11	3
Crushing, grinding, mixing, and blending machine operators and tenders	4,890	.59	6	14
Packaging and filling machine operators and tenders	4,700	.57	9	7
All other machine setters and set-up operators, except metal and plastic	2,210	.27	11	2
All other machine operators and tenders, except metal and plastic	10,890	1.32	11	7
Other hand workers, nec	56,820	6.87	n.a.	n.a.
Welders and cutters	13,510	1.63	9	21
Solderers and brazers	510	.06	19	2
Metal pourers and casters, basic shapes	11,610	1.40	4	29
Grinding and polishing workers, hand	9,030	1.09	4	11
Assemblers and fabricators, except machine, electrical, electronic, and precision	16,120	1.95	5	13
All other hand workers, nec	6,040	.73	14	5
Plant and system workers	3,940	.48	n.a.	n.a.
Power distributors and dispatchers	780	.09	19	2
Stationary engineers	1,480	.18	13	3
All other plant and system operators	1,680	.20	14	2
Motor vehicle operators	9,470	1.14	n.a.	n.a.
Truck drivers, heavy or tractor trailer	6,450	.78	8	25
Truck drivers, light, include delivery and route workers	1,990	.24	7	15
All other motor vehicle operators	1,030	.12	18	3
Rail yard engineers, dinkey operators, and hostlers	1,740	.21	15	3
Railroad brake, signal, and switch operators	1,580	.19	15	3
All other transportation and motor vehicle operators	710	.09	19	1
Material moving equipment operators	46,680	5.64	n.a.	n.a.
Grader, dozer, and scraper operators	440	.05	13	2
Hoist and winch operators	880	.11	21	2
Crane and tower operators	19,150	2.31	9	15
Industrial truck and tractor operators	19,550	2.36	4	33
Conveyor operators and tenders	3,020	.36	18	3
Pump operators	1,010	.12	16	2

See footnotes at end of table.

Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 33)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other material moving equipment operators	2,630	0.32	n.a.	n.a.
Helpers - mechanics and repairers	2,760	.33	10	6
Construction trades and extractive worker helpers	2,140	.26	12	3
Machine feeders and offbearers	10,590	1.28	7	13
Freight, stock, and material movers, hand	13,110	1.58	8	24
All other helpers, laborers, and material movers, hand	56,150	6.79	6	24

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Fabricated Metal Products, Except Machinery and Transportation Equipment

This industry, which includes establishments which fabricate ferrous and nonferrous metal products, except machinery and transportation equipment, employed nearly 1.4 million workers, or 7 percent of manufacturing and 13 percent of durable goods employment in 1983. The three largest employers of these workers were: Establishments fabricating structural metal products, with 31 percent of industry employment; those manufacturing metal forgings or metal stampings, 16 percent; and those fabricating miscellaneous metal products, also with 16 percent.

Total employment in the fabricated metal products industry declined 13 percent between 1980 and 1983. Employment fell in all major occupational groups with the exception of sales workers. Changes since 1977 are summarized in text table 12.

The fabricated metal products industry employed just over 1.0 million production and related workers, who accounted for 74 percent of total industry employment (table 18). Clerical workers accounted for 9 percent. Most of these were office clerical workers. The remaining emplyment was distributed as follows: Professional, paraprofessional, and technical workers, 7 percent; managerial and administrative workers, 6 percent; sales workers, 3 percent; and service workers, about 1 percent.

The tabulation below lists the five most populous occupations in the industry:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	103,970	7.6
Machine forming operators and tenders, metal and plastic	65,280	4.8
First-line supervisors, production	58,350	4.3
General managers and top executives	47,180	3.4
Sheet-metal workers	33,180	2.4

Text table 12. Fabricated metal products, except machinery and transportation equipment: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,588,640	1,579,960	1,369,000	-13.8
Managerial and administrative workers	90,880	103,670	82,180	-9.6
Professional, paraprofessional, and technical workers	99,200	100,760	92,580	-6.7
Sales workers	29,420	30,800	[1]35,840	21.8
Clerical workers	150,040	154,800	127,560	-15.0
Production and related workers	1,191,810	1,164,180	1,010,290	-15.2
Service workers	27,290	25,750	20,130	-26.2

[1] Includes 3,010 employees in the occupation "first-line supervisor—sales" and 2,230 employees in the sales engineer category; in previous surveys these workers would have been included in the managerial and professional categories.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,368,930	100.00	—	—
Managerial and administrative occupations	82,180	6.00	n.a.	n.a.
Financial managers	4,480	.33	3	14
Personnel, training, and labor relations managers	3,160	.23	4	12
Purchasing managers	2,230	.16	2	11
Marketing, advertising, and public relations managers	4,670	.34	3	11
Administrative services managers	2,220	.16	7	6
Industrial production managers	7,360	.54	4	15
General managers and top executives	47,180	3.45	2	84
All other managers and administrators	10,880	.79	11	11
Professional, paraprofessional, and technical occupations	92,580	6.76	n.a.	n.a.
Management support workers	24,640	1.80	n.a.	n.a.
Accountants, auditors, and other financial specialists	11,740	.86	n.a.	n.a.
Accountants and auditors	9,380	.69	2	26
Budget analysts	800	.06	13	2
All other financial specialists	1,560	.11	37	2
Purchasing agents, except wholesale and retail trade, and farm products	4,460	.33	3	15
Personnel, training, and labor relations specialists	1,680	.12	4	5
Cost estimators	4,260	.31	4	10
All other management support workers	2,500	.18	8	4
Engineers	30,680	2.24	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	780	.06	8	2
Chemical engineers	380	.03	15	1
Civil engineers, including traffic	1,320	.10	11	2
Electrical and electronic engineers	1,980	.14	17	2
Industrial engineers, except safety	3,930	.29	4	8
Safety engineers, except mining	580	.04	14	2
Mechanical engineers	15,130	1.11	5	24
All other engineers	6,580	.48	n.a.	n.a.
Engineering and related technicians and technologists	24,950	1.82	n.a.	n.a.
Civil engineering technicians and technologists	340	.02	21	[3]
Electrical and electronic engineering technicians and technologists	1,010	.07	11	2
Industrial engineering technicians and technologists	1,080	.08	7	3
Mechanical engineering technicians and technologists	1,980	.14	10	3
Drafters	17,850	1.30	3	26
All other engineering and related technicians and technologists	2,690	.20	10	3
Physical scientists	910	.07	n.a.	n.a.
Physical and life science technicians and technologists	910	.07	n.a.	n.a.
Chemical technicians and technologists, except health	760	.06	12	1
All other physical and life science technicians and technologists	150	.01	20	[3]
Computer scientists and related workers	5,700	.42	n.a.	n.a.
Systems analysts, electronic data processing	1,890	.14	7	5
Computer programmers	2,510	.18	4	7
Computer programmer aides	740	.05	6	3
Programmers - numerical, tool, and process control	560	.04	6	2
Mathematical scientists and related workers	340	.02	n.a.	n.a.

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Operations and systems researchers and analysts, except computer	340	0.02	19	1
Health practitioners, technologists, technicians, and related health workers	750	.05	4	3
Public relations specialists and publicity writers	270	.02	17	1
Designers, except interior designers	720	.05	12	1
All other professional, paraprofessional, and technical workers	2,710	.20	n.a.	n.a.
Sales and related occupations	35,840	2.62	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	3,010	.22	4	6
Sales engineers	2,230	.16	6	3
Sales representatives, scientific and related products and services, except retail	10,320	.75	4	16
Sales representatives, except scientific and related products or services and retail	17,980	1.31	3	27
All other sales and related workers	2,300	.17	8	3
Clerical and administrative support occupations	127,550	9.32	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	3,750	.27	3	9
Secretaries	27,980	2.04	2	58
Stenographers	1,200	.09	10	2
Receptionists and information clerks	1,430	.10	3	7
Typists	2,320	.17	4	4
Typists, word processing equipment	560	.04	8	2
Personnel clerks, except payroll and timekeeping	1,480	.11	3	7
File clerks	1,200	.09	5	4
Order clerks, materials, merchandise, and service	3,240	.24	3	7
Procurement clerks	1,660	.12	3	7
Bookkeeping, accounting, and auditing clerks	19,580	1.43	2	51
Payroll and timekeeping clerks	3,220	.24	2	12
Billing, cost and rate clerks	3,070	.22	3	9
General office clerks	19,960	1.46	2	42
Electronic data processing and other office machine operators	6,230	.46	n.a.	n.a.
Billing, posting, and calculating machine operators	580	.04	5	2
Computer operators, except peripheral equipment	2,310	.17	4	7
Peripheral EDP equipment operators	250	.02	11	1
Data entry keyers, except composing	2,700	.20	3	7
All other office machine operators	390	.03	11	1
Switchboard operators	1,670	.12	2	9
Material recording, scheduling, dispatching, and distributing workers	25,810	1.89	n.a.	n.a.
Production, planning, and expediting clerks	7,620	.56	2	13
Weighers, measurers, checkers, and samplers, recordkeeping	1,300	.09	8	2
Stock clerks, stockroom, warehouse or storage yard	7,050	.52	3	12
Traffic, shipping, and receiving clerks	8,340	.61	2	16
All other material recording, scheduling, and distributing workers	1,500	.11	7	3
All other clerical and administrative support workers	3,190	.23	19	3
Service occupations	20,120	1.47	n.a.	n.a.
First-line supervisors and manager/supervisors, service	1,300	.09	7	2

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Guards and watch guards	3,730	0.27	6	4
Food and beverage preparation and service workers	370	.03	14	(3)
Cleaning and building service workers, except private households	14,120	1.03	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	13,520	.99	2	33
All other cleaning and building service workers, except private households	600	.04	10	1
All other service workers	600	.04	15	1
Agriculture, forestry, fishing, and related occupations	400	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm	400	.03	10	1
Production, construction, operating, maintenance, and material handling occupations	1,010,260	73.80	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	67,460	4.93	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	3,590	.26	4	8
First-line supervisors and manager/supervisors - construction trades and extractive workers	930	.07	13	1
First-line supervisors and manager/supervisors - production and operating workers	58,350	4.26	1	71
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	1,820	.13	6	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	2,770	.20	6	4
Precision inspectors, testers, and graders	13,260	.97	3	18
Production inspectors, testers, graders, sorters, samplers, and weighers	26,800	1.96	2	25
Mechanics, installers, and repairers	53,770	3.93	n.a.	n.a.
Machinery maintenance mechanics	18,660	1.36	4	17
Millwrights	5,350	.39	6	4
Machinery maintenance workers	4,230	.31	8	6
Maintenance repairers, general utility	17,490	1.28	2	31
Automotive mechanics	820	.06	12	2
Bus and truck mechanics and diesel engine specialists	820	.06	8	2
Heating, air conditioning, and refrigeration mechanics and installers	810	.06	24	1
Riggers	530	.04	24	(3)
All other mechanics, installers, and repairers	5,060	.37	8	2
Construction trades workers, except material moving	14,820	1.08	n.a.	n.a.
Carpenters	1,680	.12	10	3
Electricians	6,940	.51	4	9
Painters and paperhangers, construction and maintenance	1,600	.12	16	2
Plumbers, pipefitters, and steamfitters	2,550	.19	8	2
All other construction trades workers	2,050	.15	15	1
Precision metal workers	116,180	8.49	n.a.	n.a.
Tool-and-die makers	30,380	2.22	5	24
Machinists	31,970	2.34	3	28
Tool grinders, filers, sharpeners, and other precision grinders	7,540	.55	4	10
Pattern and model makers, metal	2,460	.18	8	4
Precision layout workers, metal	6,790	.50	5	9

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sheet- metal workers	33,180	2.42	5	13
Boilermakers	2,560	.19	33	(*)
All other precision metal workers	1,300	.09	18	1
Precision woodworkers	360	.03	15	1
Precision workers, nec	1,850	.14	n.a.	n.a.
Precision foundry mold and core makers	1,060	.08	18	1
All other precision workers, nec	770	.06	15	1
Machine setters, set-up operators, and tenders, metal and plastic	346,630	25.32	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	4,550	.33	5	8
Lathe and turning machine tool setters and set-up operators, metal and plastic	20,460	1.49	3	13
Drilling and boring machine tool setters and set-up operators, metal and plastic	10,140	.74	4	11
Milling and planing machine setters and set-up operators, metal and plastic	2,780	.20	9	3
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	12,660	.92	4	12
Machine tool cutting operators and tenders, metal and plastic	31,310	2.29	5	14
Punching machine setters and set-up operators, metal and plastic	21,720	1.59	4	17
Press and press brake machine setters and set-up operators, metal and plastic	19,510	1.43	3	17
Shear and slitter machine setters and set-up operators, metal and plastic	8,260	.60	4	14
Extruding and drawing machine setters and set-up operators, metal and plastic	2,800	.20	8	2
Rolling machine setters and set-up operators, metal and plastic	2,670	.20	7	2
Forging machine setters and set-up operators, metal and plastic	5,170	.38	7	2
Machine forming operators and tenders, metal and plastic	65,280	4.77	4	20
Numerical control machine tool operators and tenders, metal and plastic	3,820	.28	6	3
Combination machine tool setters and set-up operators, metal and plastic	9,580	.70	5	8
Combination machine tool operators and tenders, metal and plastic	12,910	.94	6	6
Welding machine setters and set-up operators	22,510	1.64	4	17
Welding machine operators and tenders	19,910	1.45	5	10
Soldering and brazing machine setters and set-up operators	1,680	.12	9	2
Soldering and brazing machine operators and tenders	1,570	.11	12	2
Metal fabricators, structural metal products	23,060	1.68	5	11
Metal molding, coremaking, and casting machine setters and set-up operators	1,440	.11	12	1
Metal molding, coremaking, and casting machine operators and tenders	1,930	.14	15	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	9,740	.71	5	7
Electrolytic plating and coating machine operators and tenders, metal and plastic	13,390	.98	4	8
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	2,600	.19	9	3
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	2,630	.19	10	2
Heating equipment setters and set-up operators, metal and plastic	880	.06	9	1

See footnotes at end of table.

Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	2,650	0.19	6	3
Furnace operators and tenders	1,460	.11	8	2
Heaters, metal and plastic	700	.05	12	1
All other machine setters and set-up operators, metal and plastic	6,880	.50	8	3
All other machine operators and tenders, metal and plastic	11,220	.82	6	3
Machine setters, set-up operators, and tenders, except metal and plastic	55,850	4.08	n.a.	n.a.
Sawing machine operators and tenders	450	.03	14	1
Woodworking machine setters and set-up operators, except sawing	160	.01	16	(*)
Woodworking machine operators and tenders, except sawing	530	.04	18	(*)
Printing press machine setters and set-up operators	750	.05	12	1
Specialty materials printing machine setters and set-up operators	480	.03	14	(*)
All other printing related setters and set-up operators	480	.04	25	(*)
Printing and related machine operators and tenders	730	.05	n.a.	n.a.
Boiler operators and tenders, low pressure	470	.03	8	1
Coating, painting, and spraying machine setters and set-up operators	10,160	.74	4	13
Coating, painting, and spraying machine operators and tenders	9,800	.72	4	11
Cleaning, washing, and pickling equipment operators and tenders	1,650	.12	7	3
Crushing, grinding, mixing, and blending machine operators and tenders	1,170	.09	12	1
Packaging and filling machine operators and tenders	6,170	.45	7	5
All other machine setters and set-up operators, except metal and plastic	2,620	.19	10	1
All other machine operators and tenders, except metal and plastic	9,030	.66	7	2
Precision assemblers, metal	17,440	1.27	n.a.	n.a.
Fitters, structural metal, precision	13,790	1.01	5	7
All other precision assemblers, metal	3,650	.27	15	1
Other hand workers, nec	152,050	11.11	n.a.	n.a.
Glaziers, manufacturing	2,600	.19	12	1
Welders and cutters	20,310	1.48	4	8
Solderers and brazers	840	.06	13	1
Grinding and polishing workers, hand	17,300	1.26	4	13
Assemblers and fabricators, except machine, electrical, electronic, and precision	103,970	7.59	2	27
All other hand workers, nec	7,030	.51	8	3
Plant and system workers	850	.06	n.a.	n.a.
Stationary engineers	340	.02	11	1
All other plant and system operators	510	.04	11	1
Motor vehicle operators	9,520	.70	n.a.	n.a.
Truck drivers, heavy or tractor trailer	5,870	.43	4	9
Truck drivers, light, include delivery and route workers	3,320	.24	4	9
All other motor vehicle operators	330	.02	12	1
All other transportation and motor vehicle operators	590	.04	13	1
Material moving equipment operators	30,010	2.19	n.a.	n.a.
Hoist and winch operators	650	.05	11	1
Crane and tower operators	3,410	.25	6	4
Industrial truck and tractor operators	23,790	1.74	3	27
Conveyor operators and tenders	1,200	.09	12	1
All other material moving equipment operators	960	.07	11	1

See footnotes at end of table.

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Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 34)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Helpers - mechanics and repairers	1,520	0.11	10	2
Construction trades and extractive worker helpers	1,300	.09	19	1
Machine feeders and offbearers	18,000	1.31	4	8
Freight, stock, and material movers, hand	25,080	1.83	2	28
Hand packers and packagers	24,440	1.79	3	21
All other helpers, laborers, and material movers, hand	32,480	2.37	3	11

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Machinery, Except Electrical and Transportation Equipment

Manufacturers of machinery and equipment, other than electrical or transportation equipment, employed just over 2 million workers in 1983, or 11 percent of manufacturing and 19 percent of durable goods employment. The three largest employers of these workers were: Establishments manufacturing office, computing, and accounting machines, with 24 percent of industry employment; establishments manufacturing metal working machinery and equipment, 14 percent; and establishments manufacturing construction, mining, and materials handling equipment, 13 percent.

As shown in table 19, the 1.2 million production and related workers accounted for 57 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 17 percent. The remaining employment was distributed as follows: Clerical and administrative support workers, 14 percent; managerial and administrative workers, 7 percent; and sales and service workers, 3 percent and 2 percent, respectively. Text table 13 provides data since 1977 by occupational group.

The five most populous occupations in the industry are listed in the tabulation below:

	Employment	*Percent of industry employment*
Machinists	118,020	5.8
Assemblers and fabricators, except machine, electrical, electronic, and precision	102,750	5.1
First-line supervisors, production	70,710	3.5
General managers and top executives	62,720	3.1
Secretaries	57,790	2.8

Text table 13. Machinery, except electrical and transportation equipment: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	2,174,070	2,497,290	2,026,830	-6.8
Managerial and administrative workers	156,480	195,830	149,820	-4.3
Professional, paraprofessional, and technical workers	292,680	369,290	340,620	16.4
Sales workers	39,800	44,140	[1]63,060	58.4
Clerical workers	279,890	332,490	287,560	2.7
Production and related workers	1,368,450	1,515,640	1,153,170	-15.7
Service workers	36,770	39,900	31,830	-13.4

[1] Includes 5,980 employees in the occupation "first-line supervisor—sales" and 7,570 employees in the sales engineer category; in previous surveys these workers would have been included in the managerial and professional categories.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	2,026,770	100.00	—	—
Managerial and administrative occupations	149,810	7.39	n.a.	n.a.
Financial managers	9,030	.45	3	14
Personnel, training, and labor relations managers	5,410	.27	3	12
Purchasing managers	3,910	.19	3	12
Marketing, advertising, and public relations managers	11,240	.55	4	11
Administrative services managers	4,400	.22	5	6
Industrial production managers	14,150	.70	4	14
General managers and top executives	62,720	3.09	1	79
All other managers and administrators	38,950	1.92	7	12
Professional, paraprofessional, and technical occupations	340,620	16.81	n.a.	n.a.
Management support workers	61,640	3.04	n.a.	n.a.
Accountants, auditors, and other financial specialists	22,550	1.11	n.a.	n.a.
Accountants and auditors	16,320	.81	3	25
Budget analysts	2,230	.11	7	3
All other financial specialists	4,000	.20	11	3
Purchasing agents, except wholesale and retail trade, and farm products	11,330	.56	3	17
Personnel, training, and labor relations specialists	5,990	.30	5	7
Cost estimators	4,330	.21	4	8
All other management support workers	17,440	.86	13	5
Engineers	122,700	6.05	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	1,490	.07	7	2
Chemical engineers	1,730	.09	19	1
Civil engineers, including traffic	830	.04	17	1
Agricultural engineers	1,430	.07	33	(3)
Electrical and electronic engineers	43,420	2.14	8	13
Industrial engineers, except safety	20,910	1.03	7	15
Safety engineers, except mining	600	.03	6	2
Mechanical engineers	38,220	1.89	3	28
All other engineers	14,070	.69	10	4
Engineering and related technicians and technologists	83,830	4.14	n.a.	n.a.
Electrical and electronic engineering technicians and technologists	29,350	1.45	5	10
Industrial engineering technicians and technologists	4,520	.22	7	4
Mechanical engineering technicians and technologists	7,640	.38	6	5
Drafters	31,010	1.53	2	31
All other engineering and related technicians and technologists	11,310	.56	n.a.	n.a.
Physical scientists	1,590	.08	n.a.	n.a.
Physicists and astronomers	260	.01	46	(3)
Chemists, except biochemists	1,000	.05	20	1
All other physical scientists	330	.02	19	(3)
Physical and life science technicians and technologists	1,980	.10	n.a.	n.a.
Chemical technicians and technologists, except health	1,620	.08	13	1
All other physical and life science technicians and technologists	360	.02	17	(3)
Computer scientists and related workers	41,500	2.05	n.a.	n.a.
Systems analysts, electronic data processing	12,120	.60	7	7
Computer programmers	23,740	1.17	13	9
Computer programmer aides	2,340	.12	9	3

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control	3,300	0.16	8	6
Mathematical scientists and related workers	3,560	.18	n.a.	n.a.
Operations and systems researchers and analysts, except computer	2,560	.13	18	1
All other mathematical scientists	1,000	.05	n.a.	n.a.
Lawyers	740	.04	9	1
Health practitioners, technologists, technicians, and related health workers	1,330	.07	5	3
Writers and editors	1,240	.06	11	1
Technical writers	3,670	.18	6	4
Public relations specialists and publicity writers	640	.03	11	1
Designers, except interior designers	4,680	.23	8	3
All other professional, paraprofessional, and technical workers	11,520	.57	n.a.	n.a.
Sales and related occupations	63,060	3.11	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	5,980	.30	5	6
Sales engineers	7,570	.37	5	5
Sales representatives, scientific and related products and services, except retail	23,710	1.17	5	17
Sales representatives, except scientific and related products or services and retail	19,980	.99	4	20
All other sales and related workers	5,820	.29	11	4
Clerical and administrative support occupations	287,540	14.19	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	11,690	.58	7	9
Secretaries	57,790	2.85	2	58
Stenographers	3,020	.15	11	3
Receptionists and information clerks	2,270	.11	4	6
Typists	4,860	.24	4	6
Typists, word processing equipment	2,400	.12	7	3
Personnel clerks, except payroll and timekeeping	2,760	.14	4	7
File clerks	2,400	.12	5	4
Order clerks, materials, merchandise, and service	7,210	.36	5	8
Procurement clerks	3,460	.17	4	8
Statistical clerks	1,230	.06	9	2
Bookkeeping, accounting, and auditing clerks	28,210	1.39	2	47
Payroll and timekeeping clerks	4,310	.21	3	10
Billing, cost and rate clerks	5,460	.27	4	8
General office clerks	38,200	1.88	6	38
Electronic data processing and other office machine operators	16,810	.83	n.a.	n.a.
Billing, posting, and calculating machine operators	770	.04	15	1
Computer operators, except peripheral equipment	7,030	.35	6	8
Peripheral EDP equipment operators	1,210	.06	11	1
Data entry keyers, except composing	5,850	.29	3	9
All other office machine operators	1,950	.10	13	2
Switchboard operators	2,790	.14	3	9
Material recording, scheduling, dispatching, and distributing workers	80,780	3.99	n.a.	n.a.
Production, planning, and expediting clerks	25,640	1.27	5	13
Weighers, measurers, checkers, and samplers, recordkeeping	1,200	.06	11	1
Stock clerks, stockroom, warehouse or storage yard	27,190	1.34	3	26
Traffic, shipping, and receiving clerks	23,740	1.17	2	35

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other material recording, scheduling, and distributing workers	3,010	0.15	7	3
All other clerical and administrative support workers	11,890	.59	17	3
Service occupations	31,810	1.57	n.a.	n.a.
First-line supervisors and manager/supervisors, service	2,100	.10	6	3
Guards and watch guards	5,300	.26	5	4
Food and beverage preparation and service workers	1,080	.05	14	1
Cleaning and building service workers, except private households	22,470	1.11	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	21,610	1.07	3	33
All other cleaning and building service workers, except private households	860	.04	14	1
All other service workers	860	.04	15	1
Agriculture, forestry, fishing, and related occupations	780	.04	n.a.	n.a.
Gardeners and groundskeepers, except farm	570	.03	8	1
All other agriculture, forestry, fishing, and related workers	210	.01	30	[3]
Production, construction, operating, maintenance, and material handling occupations	1,153,150	56.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	80,730	3.98	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	4,550	.22	5	7
First-line supervisors and manager/supervisors - construction trades and extractive workers	1,000	.05	12	1
First-line supervisors and manager/supervisors - production and operating workers	70,710	3.49	2	60
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	2,030	.10	6	4
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	2,440	.12	6	4
Precision inspectors, testers, and graders	36,720	1.81	4	22
Production inspectors, testers, graders, sorters, samplers, and weighers	24,880	1.23	4	12
Mechanics, installers, and repairers	60,100	2.97	n.a.	n.a.
Machinery maintenance mechanics	11,510	.57	4	7
Millwrights	4,230	.21	8	3
Machinery maintenance workers	2,780	.14	11	3
Maintenance repairers, general utility	21,520	1.06	3	27
Automotive mechanics	860	.04	12	1
Bus and truck mechanics and diesel engine specialists	920	.05	18	1
Farm equipment mechanics	390	.02	28	[3]
Data processing equipment repairers	7,750	.38	32	1
Heating, air conditioning, and refrigeration mechanics and installers	1,720	.08	9	2
Precision instrument repairers	1,600	.08	15	1
Riggers	320	.02	18	[3]
All other mechanics, installers, and repairers	6,500	.32	n.a.	n.a.
Construction trades workers, except material moving	18,420	.91	n.a.	n.a.
Carpenters	1,930	.10	11	3

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Electricians	9,240	0.46	5	7
Painters and paperhangers, construction and maintenance	2,050	.10	5	3
Plumbers, pipefitters, and steamfitters	3,960	.20	9	2
All other construction trades workers	1,240	.06	33	1
Precision metal workers	208,870	10.31	n.a.	n.a.
Tool-and-die makers	52,080	2.57	3	29
Machinists	118,020	5.82	2	57
Tool grinders, filers, sharpeners, and other precision grinders	9,330	.46	6	6
Precision layout workers, metal	2,710	.13	7	3
Sheet- metal workers	22,800	1.12	4	13
All other precision metal workers	3,930	.19	n.a.	n.a.
Precision woodworkers	4,380	.22	n.a.	n.a.
Pattern and model makers, wood	3,700	.18	10	2
All other precision woodworkers	680	.03	25	([3])
Precision workers, nec	4,870	.24	n.a.	n.a.
Precision foundry mold and core makers	2,190	.11	11	1
All other precision workers, nec	2,680	.13	19	1
Machine setters, set-up operators, and tenders, metal and plastic	318,230	15.70	n.a	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	5,420	.27	4	10
Lathe and turning machine tool setters and set-up operators, metal and plastic	36,640	1.81	2	24
Drilling and boring machine tool setters and set-up operators, metal and plastic	25,640	1.27	3	18
Milling and planing machine setters and set-up operators, metal and plastic	15,850	.78	4	12
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	33,530	1.65	4	18
Machine tool cutting operators and tenders, metal and plastic	47,170	2.33	4	14
Punching machine setters and set-up operators, metal and plastic	9,340	.46	5	8
Press and press brake machine setters and set-up operators, metal and plastic	6,240	.31	5	4
Shear and slitter machine setters and set-up operators, metal and plastic	2,720	.13	5	3
Forging machine setters and set-up operators, metal and plastic	1,550	.08	15	1
Machine forming operators and tenders, metal and plastic	19,570	.97	5	9
Numerical control machine tool operators and tenders, metal and plastic	29,180	1.44	3	17
Combination machine tool setters and set-up operators, metal and plastic	13,870	.68	5	8
Combination machine tool operators and tenders, metal and plastic	11,150	.55	6	6
Welding machine setters and set-up operators	25,800	1.27	3	19
Welding machine operators and tenders	14,170	.70	5	10
Soldering and brazing machine setters and set-up operators	2,730	.13	8	3
Soldering and brazing machine operators and tenders	2,120	.10	9	2
Metal molding, coremaking, and casting machine setters and set-up operators	1,960	.10	15	1
Metal molding, coremaking, and casting machine operators and tenders	1,640	.08	12	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	820	.04	12	1
Electrolytic plating and coating machine operators and tenders, metal and plastic	980	.05	11	1

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	220	0.01	19	[3]
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	260	.01	27	[3]
Heating equipment setters and set-up operators, metal and plastic	1,370	.07	8	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	2,720	.13	6	3
Furnace operators and tenders	1,130	.06	8	1
Heaters, metal and plastic	340	.02	13	[3]
All other machine setters and set-up operators, metal and plastic	4,100	.20	9	1
All other machine operators and tenders, metal and plastic	5,220	.26	9	2
Machine setters, set-up operators, and tenders, except metal and plastic	33,720	1.66	n.a.	n.a.
Sawing machine operators and tenders	470	.02	11	1
Electronic semiconductor processors	1,080	.05	34	[3]
Boiler operators and tenders, low pressure	540	.03	18	1
Coating, painting, and spraying machine setters and set-up operators	5,810	.29	4	9
Coating, painting, and spraying machine operators and tenders	4,920	.24	5	7
Cleaning, washing, and pickling equipment operators and tenders	1,520	.07	8	2
Crushing, grinding, mixing, and blending machine operators and tenders	1,180	.06	12	1
Packaging and filling machine operators and tenders	4,800	.24	21	1
All other machine setters and set-up operators, except metal and plastic	2,420	.12	n.a.	n.a.
All other machine operators and tenders, except metal and plastic	5,760	.28	n.a.	n.a.
Precision assemblers, metal	93,180	4.60	n.a.	n.a.
Machine builders and other precision machine assemblers	35,520	1.75	4	13
Electromechanical equipment assemblers, precision	20,100	.99	14	3
Electrical and electronic equipment assemblers, precision	32,570	1.61	7	6
All other precision assemblers, metal	4,990	.25	9	1
Other hand workers, nec	194,310	9.59	n.a.	n.a.
Machine assemblers	21,000	1.04	5	7
Electrical and electronic assemblers	26,870	1.33	8	5
Coil winders, tapers, and finishers	1,500	.07	16	1
Welders and cutters	26,230	1.29	4	9
Solderers and brazers	3,040	.15	11	1
Grinding and polishing workers, hand	6,960	.34	7	4
Assemblers and fabricators, except machine, electrical, electronic, and precision	102,750	5.07	3	21
All other hand workers, nec	5,960	.29	8	2
Plant and system workers	2,050	.10	n.a.	n.a.
Stationary engineers	800	.04	11	1
All other plant and system operators	1,250	.06	36	1
Motor vehicle operators	6,170	.30	n.a.	n.a.
Truck drivers, heavy or tractor trailer	3,260	.16	9	5
Truck drivers, light, include delivery and route workers	2,540	.13	4	7
All other motor vehicle operators	370	.02	11	1
All other transportation and motor vehicle operators	620	.03	21	[3]
Material moving equipment operators	22,600	1.12	n.a.	n.a.
Hoist and winch operators	420	.02	19	[3]
Crane and tower operators	2,600	.13	8	2

See footnotes at end of table.

Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 35)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Industrial truck and tractor operators	17,560	0.87	3	14
Conveyor operators and tenders	800	.04	21	([3])
All other material moving equipment operators	1,220	.06	10	1
Helpers - mechanics and repairers	2,560	.13	8	2
Construction trades and extractive worker helpers	710	.04	14	([3])
Machine feeders and offbearers	4,090	.20	7	3
Freight, stock, and material movers, hand	18,220	.90	4	13
All other helpers, laborers, and material movers, hand	17,720	.87	6	6

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Electrical and Electronic Machinery, Equipment, and Supplies

Manufacturers of electrical and electronic machinery, equipment, and supplies employed just under 2.0 million workers, or 11 percent of manufacturing and 19 percent of durable goods employment in 1983. Establishments manufacturing electronic components and accessories employed 29 percent of the industry's workers; establishments manufacturing communications equipment, 28 percent; and those manufacturing electrical industrial apparatus, 10 percent.

The industry employed nearly 1.2 million production and related workers, accounting for almost three-fifths of total industry employment (table 20). Professional, paraprofessional, and technical workers accounted for 20 percent. Clerical and administrative support workers, primarily office clerical workers, accounted for 12 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 6 percent; and sales and service workers, 2 and 1 percent, respectively. Text table 14 shows employment by major occupational group since 1977.

The five most populous occupations in manufacturing electrical and electronic machinery, equipment, and supplies are listed in the tabulation below:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	184,210	9.1
Electrical and electronic assemblers	174,440	8.6
Electrical and electronic engineers	106,110	5.3
Electrical and electronic engineering technicians and technologists	60,500	3.0
First-line supervisors, production	59,310	2.9

Text table 14. Electrical and electronic machinery, equipment, and supplies: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,882,730	2,079,640	2,017,110	7.1
Managerial and administrative workers	105,240	133,520	123,420	17.3
Professional, paraprofessional, and technical workers	305,090	385,600	401,800	31.7
Sales workers	20,140	20,390	[1]34,460	71.1
Clerical workers	222,600	255,900	243,560	9.4
Production and related workers	1,201,160	1,254,920	1,183,940	−1.4
Service workers	28,500	29,310	29,500	3.5

[1] Includes 4,480 employees in the occupation "first-line supervisor—sales" and 6,080 employees in the sales engineer category; in previous surveys these workers would have been included in the managerial and professional categories.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	2,017,120	100.00	—	—
Managerial and administrative occupations	123,420	6.12	n.a.	n.a.
Financial managers	9,880	.49	7	31
Personnel, training, and labor relations managers	5,640	.28	5	29
Purchasing managers	4,060	.20	5	26
Marketing, advertising, and public relations managers	9,390	.47	6	24
Administrative services managers	5,760	.29	8	14
Industrial production managers	16,970	.84	8	32
General managers and top executives	33,540	1.66	3	86
All other managers and administrators	38,180	1.89	9	27
Professional, paraprofessional, and technical occupations	401,810	19.92	n.a.	n.a.
Management support workers	70,600	3.50	n.a.	n.a.
Accountants, auditors, and other financial specialists	20,410	1.01	n.a.	n.a.
Accountants and auditors	14,440	.72	5	41
Budget analysts	2,320	.12	8	8
All other financial specialists	3,650	.18	11	6
Purchasing agents, except wholesale and retail trade, and farm products	13,930	.69	3	52
Personnel, training, and labor relations specialists	5,910	.29	6	18
Cost estimators	3,500	.17	7	11
All other management support workers	26,850	1.33	8	11
Engineers	167,520	8.30	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	1,610	.08	11	4
Chemical engineers	3,320	.16	10	5
Civil engineers, including traffic	1,240	.06	38	1
Electrical and electronic engineers	106,110	5.26	2	49
Industrial engineers, except safety	18,690	.93	8	30
Safety engineers, except mining	830	.04	11	5
Mechanical engineers	19,380	.96	8	29
All other engineers	16,340	.81	13	9
Engineering and related technicians and technologists	108,420	5.37	n.a.	n.a.
Electrical and electronic engineering technicians and technologists	60,500	3.00	7	39
Industrial engineering technicians and technologists	4,380	.22	25	9
Mechanical engineering technicians and technologists	8,050	.40	24	8
Drafters	23,270	1.15	6	43
All other engineering and related technicians and technologists	12,220	.61	n.a.	n.a.
Physical scientists	3,120	.15	n.a.	n.a.
Physicists and astronomers	1,820	.09	44	1
Chemists, except biochemists	1,060	.05	11	4
All other physical scientists	240	.01	18	1
Physical and life science technicians and technologists	2,540	.13	n.a.	n.a.
Chemical technicians and technologists, except health	2,080	.10	12	4
All other physical and life science technicians and technologists	460	.02	20	1
Computer scientists and related workers	28,580	1.42	n.a.	n.a.
Systems analysts, electronic data processing	10,460	.52	19	15
Computer programmers	13,830	.69	13	19
Computer programmer aides	2,720	.13	14	8
Programmers - numerical, tool, and process control	1,570	.08	13	4

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Mathematical scientists and related workers	1,730	0.09	n.a.	n.a.
Operations and systems researchers and analysts, except computer	1,140	.06	18	3
All other mathematical scientists	380	.02	n.a.	n.a.
Mathematical technicians	210	.01	37	(3)
Lawyers	940	.05	12	3
Health practitioners, technologists, technicians, and related health workers	1,640	.08	6	9
Writers and editors	1,130	.06	12	4
Technical writers	3,530	.18	11	7
Public relations specialists and publicity writers	810	.04	10	4
Designers, except interior designers	3,570	.18	12	6
All other professional, paraprofessional, and technical workers	7,680	.38	n.a.	n.a.
Sales and related occupations	34,460	1.71	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	4,480	.22	6	13
Sales engineers	6,080	.30	7	10
Sales representatives, scientific and related products and services, except retail	12,210	.61	7	25
Sales representatives, except scientific and related products or services and retail	8,700	.43	7	16
All other sales and related workers	2,990	.15	8	7
Clerical and administrative support occupations	243,570	12.08	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	9,590	.48	8	20
Secretaries	44,270	2.19	5	70
Stenographers	3,200	.16	14	5
Receptionists and information clerks	1,920	.10	4	15
Typists	8,800	.44	5	21
Typists, word processing equipment	3,000	.15	11	7
Personnel clerks, except payroll and timekeeping	3,580	.18	4	20
File clerks	2,220	.11	6	9
Order clerks, materials, merchandise, and service	9,060	.45	4	28
Procurement clerks	4,280	.21	9	18
Statistical clerks	1,470	.07	13	4
Bookkeeping, accounting, and auditing clerks	17,730	.88	6	51
Payroll and timekeeping clerks	5,150	.26	3	31
Billing, cost and rate clerks	4,980	.25	4	18
General office clerks	23,220	1.15	9	39
Electronic data processing and other office machine operators	16,140	.80	n.a.	n.a.
Billing, posting, and calculating machine operators	680	.03	11	2
Computer operators, except peripheral equipment	6,170	.31	11	17
Peripheral EDP equipment operators	860	.04	9	3
Data entry keyers, except composing	6,560	.33	4	19
All other office machine operators	1,870	.09	10	3
Switchboard operators	2,730	.14	4	21
Material recording, scheduling, dispatching, and distributing workers	71,510	3.55	n.a.	n.a.
Production, planning, and expediting clerks	26,010	1.29	10	31
Weighers, measurers, checkers, and samplers, recordkeeping	2,640	.13	25	4
Stock clerks, stockroom, warehouse or storage yard	21,790	1.08	4	43
Traffic, shipping, and receiving clerks	17,870	.89	3	54

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other material recording, scheduling, and distributing workers	3,200	0.16	8	6
All other clerical and administrative support workers	10,720	.53	43	7
Service occupations	29,510	1.46	n.a.	n.a.
First-line supervisors and manager/supervisors, service	2,260	.11	13	8
Guards and watch guards	6,530	.32	8	9
Food and beverage preparation and service workers	860	.04	15	1
Cleaning and building service workers, except private households	18,320	.91	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	17,710	.88	5	41
All other cleaning and building service workers, except private households	610	.03	11	3
All other service workers	1,540	.08	33	1
Agriculture, forestry, fishing, and related occupations	430	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm	430	.02	11	2
Production, construction, operating, maintenance, and material handling occupations	1,183,920	58.69	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	68,290	3.39	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	4,320	.21	8	15
First-line supervisors and manager/supervisors - construction trades and extractive workers	590	.03	12	2
First-line supervisors and manager/supervisors - production and operating workers	59,310	2.94	4	70
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	1,490	.07	5	8
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	2,580	.13	8	8
Precision inspectors, testers, and graders	48,220	2.39	6	35
Production inspectors, testers, graders, sorters, samplers, and weighers	56,600	2.81	4	37
Mechanics, installers, and repairers	54,220	2.69	n.a.	n.a.
Machinery maintenance mechanics	14,570	.72	5	14
Millwrights	3,010	.15	9	4
Machinery maintenance workers	1,940	.10	10	5
Maintenance repairers, general utility	17,450	.87	4	36
Bus and truck mechanics and diesel engine specialists	470	.02	8	2
Data processing equipment repairers	1,710	.08	35	1
Electronic home entertainment equipment repairers	1,390	.07	36	1
Electric motor, transformer, and related repairers	1,040	.05	13	2
Electronics repairers, commercial and industrial equipment	5,230	.26	18	4
Heating, air conditioning, and refrigeration mechanics and installers	1,000	.05	12	3
Precision instrument repairers	2,920	.14	12	4
Electromedical and biomedical equipment repairers	240	.01	24	(3)
All other mechanics, installers, and repairers	3,250	.16	n.a.	n.a.

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Construction trades workers, except material moving	14,860	0.74	n.a.	n.a.
Carpenters	1,490	.07	7	5
Electricians	8,780	.44	6	15
Painters and paperhangers, construction and maintenance	1,200	.06	7	4
Plumbers, pipefitters, and steamfitters	2,510	.12	11	4
All other construction trades workers	880	.04	17	1
Precision metal workers	52,270	2.59	n.a.	n.a.
Tool-and-die makers	17,230	.85	5	24
Machinists	21,550	1.07	8	30
Tool grinders, filers, sharpeners, and other precision grinders	2,140	.11	15	6
Precision layout workers, metal	1,020	.05	9	3
Sheet- metal workers	8,510	.42	6	13
All other precision metal workers	1,820	.09	16	2
Precision woodworkers	590	.03	17	1
Precision workers, nec	2,390	.12	n.a.	n.a.
Precision foundry mold and core makers	480	.02	17	1
All other precision workers, nec	1,910	.09	22	2
Machine setters, set-up operators, and tenders, metal and plastic	130,990	6.49	n.a.	n.a.
Lathe and turning machine tool setters and set-up operators, metal and plastic	7,950	.39	6	11
Drilling and boring machine tool setters and set-up operators, metal and plastic	5,680	.28	7	9
Milling and planing machine setters and set-up operators, metal and plastic	2,510	.12	14	4
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	3,350	.17	8	5
Machine tool cutting operators and tenders, metal and plastic	15,760	.78	8	10
Punching machine setters and set-up operators, metal and plastic	8,690	.43	11	13
Press and press brake machine setters and set-up operators, metal and plastic	3,930	.19	7	6
Shear and slitter machine setters and set-up operators, metal and plastic	1,470	.07	7	5
Forging machine setters and set-up operators, metal and plastic	1,220	.06	17	1
Machine forming operators and tenders, metal and plastic	11,840	.59	7	8
Numerical control machine tool operators and tenders, metal and plastic	5,670	.28	10	8
Combination machine tool setters and set-up operators, metal and plastic	5,260	.26	10	6
Combination machine tool operators and tenders, metal and plastic	4,540	.23	12	5
Welding machine setters and set-up operators	3,360	.17	6	8
Welding machine operators and tenders	4,610	.23	13	5
Soldering and brazing machine setters and set-up operators	1,870	.09	14	5
Soldering and brazing machine operators and tenders	3,090	.15	16	5
Plastic molding and casting machine setters and set-up operators	4,960	.25	13	5
Plastic molding and casting machine operators and tenders	9,860	.49	8	5
Metal molding, coremaking, and casting machine setters and set-up operators	1,750	.09	10	2
Metal molding, coremaking, and casting machine operators and tenders	1,670	.08	11	2
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	5,070	.25	16	6

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Electrolytic plating and coating machine operators and tenders, metal and plastic	5,320	0.26	13	6
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	940	.05	20	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	1,010	.05	15	1
Heating equipment setters and set-up operators, metal and plastic	400	.02	17	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	1,270	.06	14	2
Furnace operators and tenders	1,110	.06	14	2
Heaters, metal and plastic	480	.02	15	1
All other machine setters and set-up operators, metal and plastic	6,350	.31	n.a.	n.a.
All other machine operators and tenders, metal and plastic	5,190	.26	15	3
Machine setters, set-up operators, and tenders, except metal and plastic	90,630	4.49	n.a.	n.a.
Printing press machine setters and set-up operators	1,060	.05	24	3
Specialty materials printing machine setters and set-up operators	490	.02	28	1
Screen printing machine setters and set-up operators	2,460	.12	14	4
All other printing related setters and set-up operators	770	.04	27	1
Printing press machine operators and tenders	730	.04	15	2
All other printing, binding, and related machine operators and tenders	820	.04	25	2
Electronic semiconductor processors	24,390	1.21	15	4
Coating, painting, and spraying machine setters and set-up operators	4,900	.24	9	12
Coating, painting, and spraying machine operators and tenders	6,460	.32	6	11
Cleaning, washing, and pickling equipment operators and tenders	1,050	.05	8	3
Crushing, grinding, mixing, and blending machine operators and tenders	2,760	.14	11	4
Packaging and filling machine operators and tenders	7,730	.38	10	7
All other machine setters and set-up operators, except metal and plastic	11,100	.55	21	3
All other machine operators and tenders, except metal and plastic	20,720	1.03	10	5
Precision assemblers, metal	132,190	6.55	n.a.	n.a.
Machine builders and other precision machine assemblers	4,060	.20	11	4
Electromechanical equipment assemblers, precision	23,790	1.18	9	8
Electrical and electronic equipment assemblers, precision	98,810	4.90	5	28
Watch, clock, and chronometer assemblers, adjusters, and calibrators, precision	880	.04	25	1
All other precision assemblers, metal	4,650	.23	23	1
Other hand workers, nec	437,000	21.66	n.a.	n.a.
Machine assemblers	13,840	.69	9	4
Electrical and electronic assemblers	174,440	8.65	3	31
Coil winders, tapers, and finishers	31,300	1.55	6	16
Welders and cutters	6,130	.30	8	7
Solderers and brazers	8,980	.45	9	6
Grinding and polishing workers, hand	2,950	.15	10	4
Assemblers and fabricators, except machine, electrical, electronic, and precision	184,210	9.13	4	33
All other hand workers, nec	15,150	.75	12	6

See footnotes at end of table.

Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 36)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Plant and system workers	1,660	0.08	n.a.	n.a.
Stationary engineers	1,040	.05	12	2
All other plant and system operators	620	.03	17	2
Motor vehicle operators	6,050	.30	n.a.	n.a.
Truck drivers, heavy or tractor trailer	3,240	.16	10	9
Truck drivers, light, include delivery and route workers	2,810	.14	7	15
All other transportation and motor vehicle operators	510	.03	n.a.	n.a.
Material moving equipment operators	18,690	.93	n.a.	n.a.
Hoist and winch operators	350	.02	21	1
Crane and tower operators	970	.05	12	2
Industrial truck and tractor operators	13,000	.64	5	15
Conveyor operators and tenders	2,830	.14	19	2
All other material moving equipment operators	1,540	.08	15	2
Helpers - mechanics and repairers	1,670	.08	8	4
Construction trades and extractive worker helpers	920	.05	35	1
Machine feeders and offbearers	10,150	.50	17	5
Freight, stock, and material movers, hand	22,290	1.11	7	22
All other helpers, laborers, and material movers, hand	33,730	1.67	8	11

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Transportation Equipment

Establishments which manufacture transportation equipment employed 1.7 million workers, or 10 percent of manufacturing and 16 percent of durable goods employment in 1983. Employers of these workers included establishments manufacturing motor vehicles and motor vehicle equipment, with 43 percent of industry employment; those manufacturing aircraft and parts, 33 percent; and those engaged in ship and boat building and repairing, 11 percent.

Overall, total employment in the transportation equipment industry declined by 87,400, or 5 percent, between 1980 and 1983. Subsectors within the industry, however, had widely different employment trends, as the following tabulation shows.

	1972 SIC Code	*Employment* 1980	1983	*Percent change*
Motor vehicles and equipment	371	731,680	753,650	3.0
Aircraft and parts	372	653,090	575,700	-11.8
Ship and boat building	373	213,880	186,900	-12.6
Railroad equipment	374	72,290	29,800	-58.7
Motorcycles, bicycles, and parts	375	19,900	15,300	-23.1
Guided missile and space vehicles	376	109,860	138,800	26.0
Miscellaneous transportation equipment	379	34,330	47,600	38.7

Employment among motor vehicle and equipment producers increased by 3 percent, while employment in establishments that produced railroad equipment declined by 59 percent and aircraft parts, by 12 percent. The increase in military spending strongly affected the guided missile and space vehicle industry. Employment in this industry expanded by almost 29,000, an increase of 26 percent over 1980.

As shown in table 21, the transportation equipment industry employed nearly 1.1 million production and related workers, who accounted for 61 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 20 percent. The remaining employment was distributed as follows: Clerical workers, 10 percent; managerial and administrative workers, 5 percent; service workers, 2 percent; and sales workers, less than 1 percent of total industry employment. Employment since 1977 by occupational group is given in text table 15.

The five most populous occupations in manufacturing transportation equipment are listed below:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	173,050	9.9
Welders and cutters	45,760	2.6
First-line supervisors, production	45,500	2.6
Production inspectors, testers, graders, sorters, samplers, and weighers	44,450	2.5
Machine tool cutting operators and tenders, metal and plastic	38,500	2.2

Text table 15. Transportation equipment: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total	1,889,390	1,835,070	1,747,670	- 7.5
Managerial and administrative workers	86,900	106,320	94,310	8.5
Professional, paraprofessional, and technical workers	250,920	312,510	352,670	40.6
Sales workers	11,040	9,470	11,190	1.4
Clerical workers	165,870	178,180	179,220	8.0
Production and related workers	1,330,380	1,188,110	1,072,720	-19.4
Service workers	44,280	40,480	36,860	-16.8

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	1,747,590	100.00	—	—
Managerial and administrative occupations	94,320	5.40	n.a.	n.a.
Financial managers	6,390	.37	9	24
Personnel, training, and labor relations managers	3,820	.22	10	22
Purchasing managers	2,810	.16	10	18
Marketing, advertising, and public relations managers	5,270	.30	11	15
Administrative services managers	4,360	.25	9	11
Industrial production managers	13,920	.80	7	24
General managers and top executives	18,520	1.06	5	81
All other managers and administrators	39,230	2.24	8	19
Professional, paraprofessional, and technical occupations	352,660	20.18	n.a.	n.a.
Management support workers	75,810	4.34	n.a.	n.a.
Accountants, auditors, and other financial specialists	19,010	1.09	n.a.	n.a.
Accountants and auditors	12,460	.71	11	20
Budget analysts	2,150	.12	13	6
All other financial specialists	4,400	.25	19	5
Purchasing agents, except wholesale and retail trade, and farm products	14,270	.82	8	45
Personnel, training, and labor relations specialists	6,360	.36	8	13
Cost estimators	7,040	.40	9	13
All other management support workers	29,130	1.67	10	9
Engineers	156,960	8.98	n.a.	n.a.
Aeronautical and astronautical engineers	29,120	1.67	2	4
Metallurgists, and metallurgical, ceramic, and materials engineers	3,210	.18	19	5
Chemical engineers	1,250	.07	19	2
Civil engineers, including traffic	2,830	.16	23	3
Electrical and electronic engineers	21,060	1.21	14	7
Industrial engineers, except safety	19,300	1.10	10	17
Safety engineers, except mining	1,900	.11	15	7
Mechanical engineers	24,440	1.40	11	27
Marine engineers	2,030	.12	44	2
All other engineers	51,820	2.97	8	8
Marine architects	320	.02	15	1
Engineering and related technicians and technologists	62,820	3.59	n.a.	n.a.
Civil engineering technicians and technologists	1,990	.11	37	1
Electrical and electronic engineering technicians and technologists	10,680	.61	16	6
Industrial engineering technicians and technologists	3,700	.21	22	6
Mechanical engineering technicians and technologists	8,440	.48	13	7
Drafters	17,750	1.02	9	26
All other engineering and related technicians and technologists	20,260	1.16	13	9
Physical scientists	2,060	.12	n.a.	n.a.
Chemists, except biochemists	680	.04	14	2
All other physical scientists	1,380	.08	18	1
Physical and life science technicians and technologists	2,040	.12	n.a.	n.a.
Chemical technicians and technologists, except health	1,300	.07	24	2
All other physical and life science technicians and technologists	740	.04	24	1
Computer scientists and related workers	20,880	1.19	n.a.	n.a.

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Systems analysts, electronic data processing	9,870	0.56	16	10
Computer programmers	7,680	.44	12	14
Computer programmer aides	1,780	.10	18	6
Programmers - numerical, tool, and process control	1,550	.09	12	5
Mathematical scientists and related workers	5,580	.32	n.a.	n.a.
Operations and systems researchers and analysts, except computer	1,540	.09	22	3
Statisticians	2,540	.15	15	3
All other mathematical scientists	660	.04	29	(3)
Mathematical technicians	840	.05	37	1
Lawyers	480	.03	11	3
Health practitioners, technologists, technicians, and related health workers	1,930	.11	7	10
Writers and editors	960	.05	14	2
Technical writers	5,020	.29	14	5
Public relations specialists and publicity writers	480	.03	16	2
Designers, except interior designers	5,040	.29	26	4
All other professional, paraprofessional, and technical workers	12,280	.70	n.a.	n.a.
Sales and related occupations	11,180	.64	n.a.	n.a.
Sales engineers	1,740	.10	11	3
Sales representatives, scientific and related products and services, except retail	2,860	.16	6	14
Sales representatives, except scientific and related products or services and retail	4,750	.27	5	22
All other sales and related workers	1,830	.10	13	5
Clerical and administrative support occupations	179,220	10.26	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	6,280	.36	5	15
Secretaries	26,630	1.52	7	60
Stenographers	3,110	.18	13	4
Receptionists and information clerks	820	.05	7	10
Typists	4,340	.25	10	10
Typists, word processing equipment	2,540	.15	15	5
Personnel clerks, except payroll and timekeeping	2,230	.13	11	12
File clerks	1,230	.07	13	4
Order clerks, materials, merchandise, and service	2,130	.12	9	8
Procurement clerks	2,060	.12	8	11
Statistical clerks	4,490	.26	14	4
Bookkeeping, accounting, and auditing clerks	9,660	.55	4	53
Payroll and timekeeping clerks	3,220	.18	6	19
Billing, cost and rate clerks	2,360	.14	8	12
General office clerks	19,700	1.13	9	41
Electronic data processing and other office machine operators	11,540	.66	n.a.	n.a.
Billing, posting, and calculating machine operators	400	.02	11	2
Computer operators, except peripheral equipment	3,540	.20	9	12
Peripheral EDP equipment operators	1,300	.07	27	3
Data entry keyers, except composing	4,620	.26	7	13
All other office machine operators	1,680	.10	14	3
Switchboard operators	1,340	.08	5	15
Material recording, scheduling, dispatching, and distributing workers	64,250	3.68	n.a.	n.a.
Dispatchers, except police, fire, and ambulance	1,740	.10	21	4
Production, planning, and expediting clerks	25,990	1.49	8	31

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Weighers, measurers, checkers, and samplers, recordkeeping	3,560	0.20	16	3
Stock clerks, stockroom, warehouse or storage yard	18,830	1.08	6	22
Traffic, shipping, and receiving clerks	11,150	.64	5	41
All other material recording, scheduling, and distributing workers	2,980	.17	12	4
All other clerical and administrative support workers	11,290	.65	17	6
Service occupations	36,880	2.11	n.a.	n.a.
First-line supervisors and manager/supervisors, service	2,500	.14	8	7
Guards and watch guards	11,880	.68	7	12
Food and beverage preparation and service workers	760	.04	22	1
Cleaning and building service workers, except private households	20,280	1.16	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	19,840	1.14	5	39
All other cleaning and building service workers, except private households	440	.03	15	2
All other service workers	1,460	.08	16	3
Agriculture, forestry, fishing, and related occupations	600	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm	600	.03	14	3
Production, construction, operating, maintenance, and material handling occupations	1,072,730	61.38	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	65,380	3.74	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	7,340	.42	7	14
First-line supervisors and manager/supervisors - construction trades and extractive workers	4,260	.24	19	3
First-line supervisors and manager/supervisors - production and operating workers	45,500	2.60	4	63
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	3,570	.20	7	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	4,710	.27	11	9
Precision inspectors, testers, and graders	29,500	1.69	6	23
Production inspectors, testers, graders, sorters, samplers, and weighers	44,450	2.54	3	24
Transportation inspectors	960	.05	26	1
Mechanics, installers, and repairers	106,090	6.07	n.a.	n.a.
Machinery maintenance mechanics	16,150	.92	7	12
Millwrights	11,780	.67	8	7
Machinery maintenance workers	4,730	.27	8	12
Maintenance repairers, general utility	9,040	.52	5	31
Automotive mechanics	4,200	.24	12	10
Automotive body and related repairers	1,720	.10	18	2
Bus and truck mechanics and diesel engine specialists	3,140	.18	13	4
Rail car repairers	1,050	.06	19	1
Aircraft mechanics	11,280	.65	15	3
Aircraft engine specialists	1,280	.07	24	2

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Electronics repairers, commercial and industrial equipment	3,610	0.21	12	4
Electrical installers and repairers, transportation equipment	5,300	.30	14	6
Heating, air conditioning, and refrigeration mechanics and installers	1,610	.09	8	4
Precision instrument repairers	2,060	.12	12	3
Riggers	3,820	.22	10	5
All other mechanics, installers, and repairers	25,320	1.45	10	8
Construction trades workers, except material moving	57,560	3.29	n.a.	n.a.
Carpenters	9,250	.53	5	19
Electricians	22,740	1.30	6	21
Painters and paperhangers, construction and maintenance	5,790	.33	7	9
Plumbers, pipefitters, and steamfitters	16,210	.93	6	12
Insulation workers	1,650	.09	30	1
All other construction trades workers	1,920	.11	17	3
Precision metal workers	103,460	5.92	n.a.	n.a.
Tool-and-die makers	24,880	1.42	7	16
Machinists	31,210	1.79	6	32
Tool grinders, filers, sharpeners, and other precision grinders	4,980	.28	7	9
Precision layout workers, metal	2,360	.14	11	5
Shipfitters	9,890	.57	10	6
Sheet- metal workers	21,840	1.25	7	17
Boilermakers	2,180	.12	17	1
All other precision metal workers	6,120	.35	15	3
Precision woodworkers	4,380	.25	n.a.	n.a.
Pattern and model makers, wood	3,570	.20	20	4
All other precision woodworkers	810	.05	18	1
Precision workers, nec	4,010	.23	20	2
Machine setters, set-up operators, and tenders, metal and plastic	188,730	10.80	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	2,480	.14	15	8
Lathe and turning machine tool setters and set-up operators, metal and plastic	15,850	.91	9	14
Drilling and boring machine tool setters and set-up operators, metal and plastic	10,980	.63	10	12
Milling and planing machine setters and set-up operators, metal and plastic	9,250	.53	9	9
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	13,040	.75	11	15
Machine tool cutting operators and tenders, metal and plastic	38,500	2.20	3	13
Punching machine setters and set-up operators, metal and plastic	3,840	.22	8	8
Press and press brake machine setters and set-up operators, metal and plastic	5,090	.29	9	7
Forging machine setters and set-up operators, metal and plastic	6,820	.39	16	3
Machine forming operators and tenders, metal and plastic	17,540	1.00	8	11
Numerical control machine tool operators and tenders, metal and plastic	9,370	.54	9	6
Combination machine tool setters and set-up operators, metal and plastic	8,990	.51	11	8
Combination machine tool operators and tenders, metal and plastic	3,990	.23	11	5
Welding machine setters and set-up operators	7,050	.40	7	14
Welding machine operators and tenders	16,080	.92	9	10
Soldering and brazing machine setters and set-up operators	870	.05	13	3
Soldering and brazing machine operators and tenders	590	.03	16	1

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Plastic molding and casting machine setters and set-up operators	1,420	0.08	15	2
Plastic molding and casting machine operators and tenders	2,650	.15	16	1
Metal molding, coremaking, and casting machine setters and set-up operators	990	.06	23	1
Metal molding, coremaking, and casting machine operators and tenders	520	.03	15	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	730	.04	16	2
Electrolytic plating and coating machine operators and tenders, metal and plastic	1,440	.08	11	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	430	.02	21	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	230	.01	20	1
Heating equipment setters and set-up operators, metal and plastic	1,110	.06	13	3
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	2,680	.15	9	5
All other machine setters and set-up operators, metal and plastic	6,200	.35	14	3
All other machine operators and tenders, metal and plastic	6,780	.39	11	4
Machine setters, set-up operators, and tenders, except metal and plastic	60,700	3.47	n.a.	n.a.
Sawing machine operators and tenders	750	.04	13	2
Woodworking machine setters and set-up operators, except sawing	500	.03	20	2
Woodworking machine operators and tenders, except sawing	970	.06	13	3
Painters, transportation equipment	9,370	.54	10	8
Coating, painting, and spraying machine setters and set-up operators	3,210	.18	7	14
Coating, painting, and spraying machine operators and tenders	3,960	.23	8	13
Cleaning, washing, and pickling equipment operators and tenders	990	.06	9	4
All other machine setters and set-up operators, except metal and plastic	3,010	.17	12	3
All other machine operators and tenders, except metal and plastic	31,160	1.78	2	7
Precision assemblers, metal	47,710	2.73	n.a.	n.a.
Aircraft structure, surfaces, rigging, and systems assemblers, precision	20,210	1.16	13	3
Machine builders and other precision machine assemblers	7,570	.43	15	4
Electromechanical equipment assemblers, precision	3,150	.18	13	2
Electrical and electronic equipment assemblers, precision	9,600	.55	13	3
All other precision assemblers, metal	7,180	.41	19	2
Other hand workers, nec	266,280	15.24	n.a.	n.a.
Machine assemblers	8,730	.50	6	4
Electrical and electronic assemblers	9,470	.54	13	4
Welders and cutters	45,760	2.62	5	33
Solderers and brazers	1,900	.11	15	3
Grinding and polishing workers, hand	13,210	.76	9	8
Assemblers and fabricators, except machine, electrical, electronic, and precision	173,050	9.90	1	41
All other hand workers, nec	14,160	.81	7	7
Plant and system workers	3,070	.18	n.a.	n.a.
Stationary engineers	1,130	.06	10	3
All other plant and system operators	1,940	.11	15	4

See footnotes at end of table.

Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued

(SIC 37)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Motor vehicle operators	10,440	0.60	n.a.	n.a.
Truck drivers, heavy or tractor trailer	5,020	.29	6	20
Truck drivers, light, include delivery and route workers	2,040	.12	6	11
All other motor vehicle operators	3,380	.19	11	3
All other transportation and motor vehicle operators	2,180	.12	33	3
Material moving equipment operators	29,260	1.67	n.a.	n.a.
Hoist and winch operators	500	.03	18	2
Crane and tower operators	3,560	.20	8	8
Industrial truck and tractor operators	20,930	1.20	6	22
Conveyor operators and tenders	3,230	.18	15	1
All other material moving equipment operators	1,040	.06	11	2
Helpers - mechanics and repairers	2,090	.12	13	5
Construction trades and extractive worker helpers	1,270	.07	11	2
Machine feeders and offbearers	7,670	.44	19	4
Freight, stock, and material movers, hand	10,400	.60	5	21
All other helpers, laborers, and material movers, hand	27,140	1.55	7	14

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Instruments and Related Products

In 1983, establishments manufacturing instruments, ophthalmic goods, photographic equipment and supplies, and watches and clocks employed 688,150 workers, accounting for 4 percent of manufacturing and 6 percent of durable goods employment. Workers in establishments producing measuring and controlling instruments constituted 34 percent of industry employment; establishments manufacturing surgical, medical, and dental instruments and supplies accounted for 24 percent; and those manufacturing photographic equipment and supplies, 19 percent.

The industry's 351,250 production and related workers accounted for 51 percent of total industry employment (table 22). Professional, paraprofessional, and technical workers ranked second with 19 percent. Clerical workers accounted for 16 percent; managerial and administative workers, 8 percent; sales and service workers, 4 and 2 percent, respectively.

The tabulation below lists the five most populous occupations in the industry:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	59,620	8.7
Electrical and electronic assemblers	24,820	3.6
Electrical and electronic engineers	24,800	3.6
Secretaries	23,840	3.5
First-line supervisors, production	22,510	3.3

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983

(SIC 38)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	688,120	100.00	—	—
Managerial and administrative occupations	56,990	8.28	n.a.	n.a.
Financial managers	4,050	.59	11	23
Personnel, training, and labor relations managers	2,320	.34	6	21
Purchasing managers	1,690	.25	6	19
Marketing, advertising, and public relations managers	5,690	.83	8	21
Administrative services managers	2,000	.29	8	11
Industrial production managers	6,050	.88	7	22
General managers and top executives	19,900	2.89	3	84
All other managers and administrators	15,290	2.22	11	20
Professional, paraprofessional, and technical occupations	132,560	19.26	n.a.	n.a.
Management support workers	21,600	3.14	n.a.	n.a.
Accountants, auditors, and other financial specialists	6,270	.91	n.a.	n.a.
Accountants and auditors	4,040	.59	5	20
Budget analysts	1,140	.17	20	6
All other financial specialists	1,090	.16	10	6
Purchasing agents, except wholesale and retail trade, and farm products	6,110	.89	3	45
Personnel, training, and labor relations specialists	2,210	.32	11	12
Cost estimators	1,060	.15	8	7
All other management support workers	5,950	.86	19	9
Engineers	46,700	6.79	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers	320	.05	12	2
Chemical engineers	1,320	.19	15	4
Electrical and electronic engineers	24,800	3.60	8	35
Industrial engineers, except safety	5,480	.80	16	15
Mechanical engineers	7,420	1.08	6	19
All other engineers	7,360	1.07	n.a.	n.a.
Engineering and related technicians and technologists	38,650	5.62	n.a.	n.a.
Electrical and electronic engineering technicians and technologists	18,930	2.75	4	32
Industrial engineering technicians and technologists	1,170	.17	11	5
Mechanical engineering technicians and technologists	5,420	.79	26	8
Drafters	8,530	1.24	5	37
All other engineering and related technicians and technologists	4,600	.67	11	7
Physical scientists	3,000	.44	n.a.	n.a.
Physicists and astronomers	280	.04	17	2
Chemists, except biochemists	1,790	.26	14	5
All other physical scientists	930	.14	41	1
Life scientists	770	.11	20	2
Physical and life science technicians and technologists	3,510	.51	n.a.	n.a.
Chemical technicians and technologists, except health	2,730	.40	14	5
All other physical and life science technicians and technologists	780	.11	19	2
Computer scientists and related workers	8,160	1.19	n.a.	n.a.
Systems analysts, electronic data processing	3,010	.44	10	12
Computer programmers	3,910	.57	16	15
Computer programmer aides	910	.13	8	7
Programmers - numerical, tool, and process control	330	.05	9	3
Mathematical scientists and related workers	390	.06	n.a.	n.a.

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 38)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Operations and systems researchers and analysts, except computer	390	0.06	19	2
Opticians, dispensing and measuring	1,490	.22	13	3
All other health professionals, paraprofessional and technicians	1,200	.17	15	6
Writers and editors	640	.09	20	4
Technical writers	1,390	.20	10	8
Designers, except interior designers	1,850	.27	13	6
All other professional, paraprofessional, and technical workers	3,210	.47	n.a.	n.a.
Sales and related occupations	25,680	3.73	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	3,300	.48	8	10
Sales engineers	3,040	.44	9	7
Sales representatives, scientific and related products and services, except retail	12,730	1.85	6	28
Sales representatives, except scientific and related products or services and retail	4,970	.72	8	16
All other sales and related workers	1,640	.24	10	5
Clerical and administrative support occupations	109,590	15.93	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	3,930	.57	6	15
Secretaries	23,840	3.46	5	70
Stenographers	720	.10	16	2
Receptionists and information clerks	960	.14	6	11
Typists	3,500	.51	9	16
Typists, word processing equipment	1,600	.23	6	12
Personnel clerks, except payroll and timekeeping	1,220	.18	5	13
File clerks	1,690	.25	14	8
Order clerks, materials, merchandise, and service	5,160	.75	6	18
Procurement clerks	1,520	.22	7	13
Bookkeeping, accounting, and auditing clerks	9,920	1.44	3	57
Payroll and timekeeping clerks	1,370	.20	3	16
Billing, cost and rate clerks	2,100	.31	4	14
General office clerks	10,040	1.46	6	40
Electronic data processing and other office machine operators	5,940	.86	n.a.	n.a.
Billing, posting, and calculating machine operators	350	.05	21	2
Computer operators, except peripheral equipment	2,210	.32	7	13
Peripheral EDP equipment operators	330	.05	10	2
Data entry keyers, except composing	2,680	.39	5	13
All other office machine operators	370	.05	16	2
Switchboard operators	2,080	.30	3	26
Material recording, scheduling, dispatching, and distributing workers	29,030	4.22	n.a.	n.a.
Production, planning, and expediting clerks	8,310	1.21	6	21
Weighers, measurers, checkers, and samplers, recordkeeping	520	.08	15	2
Stock clerks, stockroom, warehouse or storage yard	10,550	1.53	7	37
Traffic, shipping, and receiving clerks	8,860	1.29	3	48
All other material recording, scheduling, and distributing workers	790	.11	11	4
All other clerical and administrative support workers	4,970	.72	44	5
Service occupations	11,840	1.72	n.a.	n.a.
First-line supervisors and manager/supervisors, service	1,200	.17	10	6

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 38)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Guards and watch guards	1,690	0.25	13	4
Food and beverage preparation and service workers	420	.06	29	1
Cleaning and building service workers, except private households	7,590	1.10	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	6,710	.98	4	33
All other cleaning and building service workers, except private households	880	.13	25	2
All other service workers	940	.14	29	2
Agriculture, forestry, fishing, and related occupations	240	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm	240	.03	15	2
Production, construction, operating, maintenance, and material handling occupations	351,220	51.04	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	25,550	3.71	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	1,180	.17	7	7
First-line supervisors and manager/supervisors - construction trades and extractive workers	200	.03	15	1
First-line supervisors and manager/supervisors - production and operating workers	22,510	3.27	4	64
All other first-line supervisors and manager/ supervisors - production, construction, maintenance and related	1,660	.24	10	6
Precision inspectors, testers, and graders	12,450	1.81	5	30
Production inspectors, testers, graders, sorters, samplers, and weighers	15,820	2.30	9	23
Mechanics, installers, and repairers	16,320	2.37	n.a.	n.a.
Machinery maintenance mechanics	4,030	.59	12	11
Machinery maintenance workers	790	.11	23	2
Maintenance repairers, general utility	5,640	.82	14	23
Precision instrument repairers	4,340	.63	15	10
Camera and photographic equipment repairers	300	.04	42	[3]
Watchmakers	160	.02	30	[3]
All other mechanics, installers, and repairers	1,060	.15	n.a.	n.a.
Construction trades workers, except material moving	3,820	.56	n.a.	n.a.
Carpenters	530	.08	11	4
Electricians	1,710	.25	18	7
Painters and paperhangers, construction and maintenance	430	.06	15	3
Plumbers, pipefitters, and steamfitters	680	.10	19	2
All other construction trades workers	470	.07	25	1
Precision metal workers	24,940	3.62	n.a.	n.a.
Tool-and-die makers	3,920	.57	7	12
Precision instrument makers	4,160	.60	10	7
Machinists	12,130	1.76	4	34
Tool grinders, filers, sharpeners, and other precision grinders	1,550	.23	11	7
Sheet- metal workers	2,650	.39	11	8
All other precision metal workers	530	.08	17	1
Precision woodworkers	390	.06	46	1
Precision workers, nec	14,820	2.15	n.a.	n.a.
Precision detail design decorators, and painters	120	.02	23	1
Precision optical goods workers	10,600	1.54	6	13
Medical appliance makers	2,190	.32	23	4
All other precision workers, nec	1,910	.28	24	3

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 38)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Machine setters, set-up operators, and tenders, metal and plastic	30,840	4.48	n.a.	n.a.
Sewing machine tool setters and set-up operators, metal and plastic	190	.03	14	2
Lathe and turning machine tool setters and set-up operators, metal and plastic	3,740	.54	7	11
Drilling and boring machine tool setters and set-up operators, metal and plastic	2,200	.32	8	8
Milling and planing machine setters and set-up operators, metal and plastic	1,150	.17	12	5
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	1,450	.21	17	3
Machine tool cutting operators and tenders, metal and plastic	3,930	.57	12	7
Punching machine setters and set-up operators, metal and plastic	1,930	.28	11	7
Press and press brake machine setters and set-up operators, metal and plastic	540	.08	13	2
Shear and slitter machine setters and set-up operators, metal and plastic	760	.11	27	2
Machine forming operators and tenders, metal and plastic	4,870	.71	11	7
Numerical control machine tool operators and tenders, metal and plastic	2,130	.31	8	7
Combination machine tool setters and set-up operators, metal and plastic	1,670	.24	9	6
Combination machine tool operators and tenders, metal and plastic	1,980	.29	11	4
Soldering and brazing machine setters and set-up operators	210	.03	19	1
Soldering and brazing machine operators and tenders	330	.05	19	1
Metal molding, coremaking, and casting machine setters and set-up operators	570	.08	18	1
Metal molding, coremaking, and casting machine operators and tenders	350	.05	19	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	400	.06	17	2
Electrolytic plating and coating machine operators and tenders, metal and plastic	390	.06	13	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	130	.02	36	[3]
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	290	.04	26	1
Heating equipment setters and set-up operators, metal and plastic	160	.02	46	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	140	.02	21	1
All other machine setters and set-up operators, metal and plastic	1,330	.19	21	2
All other machine operators and tenders, metal and plastic	3,330	.48	17	2
Machine setters, set-up operators, and tenders, except metal and plastic	40,530	5.89	n.a.	n.a.
Sewing machine operators, nongarment	3,400	.49	12	5
Electronic semiconductor processors	1,050	.15	41	1
Chemical equipment controllers and operators	2,550	.37	36	1
Coating, painting, and spraying machine setters and set-up operators	1,150	.17	19	3
Coating, painting, and spraying machine operators and tenders	2,130	.31	19	3

See footnotes at end of table.

Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued

(SIC 38)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Cleaning, washing, and pickling equipment operators and tenders	380	0.06	12	2
Crushing, grinding, mixing, and blending machine operators and tenders	2,440	.35	13	5
Packaging and filling machine operators and tenders	5,450	.79	12	6
All other machine setters and set-up operators, except metal and plastic	2,140	.31	22	2
All other machine operators and tenders, except metal and plastic	16,510	2.40	n.a.	n.a.
Precision assemblers, metal	35,030	5.09	n.a.	n.a.
Machine builders and other precision machine assemblers	1,460	.21	29	2
Electromechanical equipment assemblers, precision	9,530	1.38	21	4
Electrical and electronic equipment assemblers, precision	18,850	2.74	8	18
Watch, clock, and chronometer assemblers, adjusters, and calibrators, precision	3,170	.46	30	2
All other precision assemblers, metal	2,020	.29	22	1
Other hand workers, nec	104,110	15.13	n.a.	n.a.
Machine assemblers	3,990	.58	17	3
Electrical and electronic assemblers	24,820	3.61	7	18
Welders and cutters	2,640	.38	9	11
Solderers and brazers	2,530	.37	9	7
Painting, coating, and decorating, workers, hand	1,280	.19	11	8
Grinding and polishing workers, hand	3,390	.49	9	8
Assemblers and fabricators, except machine, electrical, electronic, and precision	59,620	8.66	5	31
All other hand workers, nec	5,840	.85	18	3
Plant and system workers	790	.11	n.a.	n.a.
Stationary engineers	470	.07	31	1
All other plant and system operators	320	.05	n.a.	n.a.
Motor vehicle operators	970	.14	n.a.	n.a.
Truck drivers, heavy or tractor trailer	200	.03	17	2
Truck drivers, light, include delivery and route workers	770	.11	7	8
All other transportation and motor vehicle operators	140	.02	n.a.	n.a.
Material moving equipment operators	2,480	.36	n.a.	n.a.
Industrial truck and tractor operators	1,620	.26	11	4
Conveyor operators and tenders	140	.02	31	[3]
All other material moving equipment operators	520	.08	30	1
Helpers - mechanics and repairers	430	.06	18	2
Construction trades and extractive worker helpers	160	.02	29	[3]
Machine feeders and offbearers	2,080	.30	17	3
Freight, stock, and material movers, hand	6,060	.88	6	15
Hand packers and packagers	7,440	1.08	17	8
All other helpers, laborers, and material movers, hand	6,050	.88	11	5

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Miscellaneous Manufacturing Industries

Establishments which manufacture products other than those previously discussed employed 369,830 workers in 1983, or 2 percent of manufacturing and 3 percent of durable goods employment. Of these workers, 33 percent worked in establishments manufacturing brooms and brushes, signs and advertising displays, burial caskets, and other miscellaneous products; 29 percent worked in establishments manufacturing toys and amusement, sporting, and athletic goods; and 14 percent worked in establishments producing jewelry, silverware, and plated ware.

As shown in table 23, the largest occupational group in miscellaneous manufacturing industries, consisting of 255,110 production and related workers, accounted for 69 percent of total industry employment. Clerical workers ranked second with 14 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 7 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers, 4 percent; and service workers, 1 percent.

The five most populous occupations in miscellaneous manufacturing industries are listed in the tabulation below:

	Employment	*Percent of industry employment*
Assemblers and fabricators, except machine, electrical, electronic, and precision	40,750	11.0
Hand packers and packagers	18,020	4.9
General managers and top executives	17,260	4.7
First-line supervisors, production	14,470	3.9
Secretaries	9,380	2.5

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Total	368,770	100.00	—	—
Managerial and administrative occupations	24,970	6.75	n.a.	n.a.
Financial managers	1,210	.33	4	8
Personnel, training, and labor relations managers	580	.16	4	8
Purchasing managers	520	.14	3	6
Marketing, advertising, and public relations managers	1,550	.42	6	7
Administrative services managers	390	.11	7	3
Industrial production managers	1,730	.47	6	9
General managers and top executives	17,260	4.67	2	81
All other managers and administrators	1,730	.47	5	6
Professional, paraprofessional, and technical occupations	18,820	5.09	n.a.	n.a.
Management support workers	6,960	1.88	n.a.	n.a.
Accountants, auditors, and other financial specialists	3,260	.88	n.a.	n.a.
Accountants and auditors	2,670	.72	5	17
Budget analysts	210	.06	10	2
All other financial specialists	380	.10	13	2
Purchasing agents, except wholesale and retail trade, and farm products	2,210	.60	3	20
Personnel, training, and labor relations specialists	340	.09	10	3
Cost estimators	430	.12	6	3
All other management support workers	720	.19	11	2
Engineers	2,220	.60	n.a.	n.a.
Industrial engineers, except safety	750	.20	5	5
Mechanical engineers	950	.26	8	5
All other engineers	520	.14	12	2
Engineering and related technicians and technologists	2,620	.71	n.a.	n.a.
Industrial engineering technicians and technologists	240	.06	7	2
Mechanical engineering technicians and technologists	240	.06	12	1
Drafters	1,560	.42	4	10
All other engineering and related technicians and technologists	580	.16	12	2
Physical scientists	200	.05	n.a.	n.a.
Physical and life science technicians and technologists	370	.10	n.a.	n.a.
Chemical technicians and technologists, except health	250	.07	10	1
All other physical and life science technicians and technologists	120	.03	27	(3)
Computer scientists and related workers	1,610	.44	n.a.	n.a.
Systems analysts, electronic data processing	620	.17	10	3
Computer programmers	710	.19	5	5
All other computer systems analysts, programmers, and programmer aides	280	.08	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers	130	.04	9	1
Designers, except interior designers	4,070	1.10	4	20
All other professional, paraprofessional, and technical workers	640	.17	n.a.	n.a.
Sales and related occupations	13,660	3.69	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers	990	.27	7	4

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Sales representatives, scientific and related products and services, except retail	3,110	0.84	5	13
Sales representatives, except scientific and related products or services and retail	7,880	2.13	3	26
All other sales and related workers	1,680	.45	10	4
Clerical and administrative support occupations	51,800	14.01	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers	1,440	.39	5	7
Secretaries	9,380	2.54	2	53
Stenographers	170	.05	11	1
Receptionists and information clerks	520	.14	7	5
Typists	1,780	.48	4	11
Typists, word processing equipment	570	.15	7	4
Personnel clerks, except payroll and timekeeping	450	.12	4	4
File clerks	540	.15	6	4
Order clerks, materials, merchandise, and service	4,110	1.11	3	18
Procurement clerks	480	.13	5	5
Bookkeeping, accounting, and auditing clerks	7,100	1.92	2	46
Payroll and timekeeping clerks	920	.25	5	7
Billing, cost and rate clerks	1,020	.28	4	6
General office clerks	6,570	1.78	3	34
Electronic data processing and other office machine operators	2,310	.62	n.a.	n.a.
Billing, posting, and calculating machine operators	330	.09	11	1
Computer operators, except peripheral equipment	670	.18	5	5
Data entry keyers, except composing	1,180	.32	5	6
All other office machine operators	130	.04	17	1
Switchboard operators	520	.14	3	6
Material recording, scheduling, dispatching, and distributing workers	13,290	3.59	n.a.	n.a.
Production, planning, and expediting clerks	1,760	.48	4	7
Weighers, measurers, checkers, and samplers, recordkeeping	340	.09	9	2
Stock clerks, stockroom, warehouse or storage yard	1,880	.51	7	7
Traffic, shipping, and receiving clerks	8,930	2.42	2	41
All other material recording, scheduling, and distributing workers	380	.10	14	1
All other clerical and administrative support workers	630	.17	10	2
Service occupations	5,370	1.45	n.a.	n.a.
First-line supervisors and manager/supervisors, service	340	.09	16	2
Guards and watch guards	610	.16	7	3
Food and beverage preparation and service workers	70	.02	16	(*)
Cleaning and building service workers, except private households	3,630	.98	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners	3,460	.94	2	25
All other cleaning and building service workers, except private households	170	.05	10	1
All other service workers	720	.19	37	(*)
Agriculture, forestry, fishing, and related occupations	80	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm	80	.02	14	1

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Production, construction, operating, maintenance, and material handling occupations	255,070	68.98	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers	15,500	4.19	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers	400	.11	8	3
First-line supervisors and manager/supervisors - production and operating workers	14,470	3.91	2	55
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers	240	.06	9	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand	390	.11	9	2
Precision inspectors, testers, and graders	2,150	.58	5	8
Production inspectors, testers, graders, sorters, samplers, and weighers	5,150	1.39	4	11
Mechanics, installers, and repairers	8,300	2.24	n.a.	n.a.
Machinery maintenance mechanics	1,600	.43	8	4
Machinery maintenance workers	410	.11	16	2
Maintenance repairers, general utility	4,760	1.29	3	24
Musical instrument repairers and tuners	260	.07	15	1
All other mechanics, installers, and repairers	1,270	.34	9	4
Construction trades workers, except material moving	4,860	1.31	n.a.	n.a.
Carpenters	1,750	.47	9	5
Electricians	2,440	.66	6	10
Painters and paperhangers, construction and maintenance	260	.07	15	1
Plumbers, pipefitters, and steamfitters	160	.04	13	1
All other construction trades workers	250	.07	24	1
Precision metal workers	25,750	6.96	n.a.	n.a.
Tool-and-die makers	2,490	.67	5	7
Machinists	1,800	.49	7	5
Tool grinders, filers, sharpeners, and other precision grinders	1,430	.39	8	4
Jewelers and silversmiths	5,440	1.47	5	11
Precision hand workers, jewelry and related products	7,370	1.99	5	12
Precision etchers and engravers, hand or machine	1,890	.51	6	7
Sheet- metal workers	4,940	1.34	5	13
All other precision metal workers	390	.11	15	1
Precision woodworkers	4,960	1.34	n.a.	n.a.
Pattern and model makers, wood	240	.06	17	1
Wood machinists	460	.12	20	1
Cabinetmakers and bench carpenters	3,820	1.03	6	7
All other precision woodworkers	440	.12	n.a.	n.a.
Precision printing workers	440	.12	n.a.	n.a.
Precision compositors, typesetters, and arrangers	320	.09	14	2
All other precision printing workers	120	.03	22	(3)
Precision workers, nec	4,660	1.26	n.a.	n.a.
Precision molders, shapers, casters, and carvers, except jewelry and foundry	430	.12	16	1
Precision patternmakers, model makers, layout workers, and cutters	310	.08	14	1
Precision detail design decorators, and painters	2,300	.62	7	9
Gem and diamond workers	610	.16	13	2
All other precision workers, nec	1,010	.27	13	2

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Machine setters, set-up operators, and tenders, metal and plastic	33,130	8.96	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic	260	.07	16	1
Lathe and turning machine tool setters and set-up operators, metal and plastic	480	.13	17	1
Drilling and boring machine tool setters and set-up operators, metal and plastic	580	.16	14	1
Milling and planing machine setters and set-up operators, metal and plastic	150	.04	16	1
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic	3,810	1.03	5	10
Machine tool cutting operators and tenders, metal and plastic	5,160	1.40	6	12
Punching machine setters and set-up operators, metal and plastic	4,480	1.21	5	11
Rolling machine setters and set-up operators, metal and plastic	250	.07	20	1
Machine forming operators and tenders, metal and plastic	2,850	.77	10	2
Numerical control machine tool operators and tenders, metal and plastic	100	.03	20	1
Combination machine tool setters and set-up operators, metal and plastic	490	.13	20	1
Combination machine tool operators and tenders, metal and plastic	460	.12	17	1
Soldering and brazing machine setters and set-up operators	150	.04	18	1
Soldering and brazing machine operators and tenders	330	.09	19	1
Plastic molding and casting machine setters and set-up operators	2,310	.62	8	7
Plastic molding and casting machine operators and tenders	6,490	1.76	9	7
Metal molding, coremaking, and casting machine setters and set-up operators	400	.11	22	1
Metal molding, coremaking, and casting machine operators and tenders	640	.17	9	2
Electrolytic plating and coating machine setters and set-up operators, metal and plastic	550	.15	9	2
Electrolytic plating and coating machine operators and tenders, metal and plastic	530	.14	10	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic	100	.03	25	(3)
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic	500	.14	15	1
Heating equipment setters and set-up operators, metal and plastic	120	.03	24	(3)
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic	110	.03	14	1
Heaters, metal and plastic	90	.02	22	(3)
All other machine setters and set-up operators, metal and plastic	1,740	.47	12	1
All other machine operators and tenders, metal and plastic	1,670	.45	15	2
Machine setters, set-up operators, and tenders, except metal and plastic	39,620	10.71	n.a.	n.a.
Sawing machine setters and set-up operators	140	.04	21	(3)
Sawing machine operators and tenders	430	.12	15	1
Woodworking machine setters and set-up operators, except sawing	560	.15	15	1

See footnotes at end of table.

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
Woodworking machine operators and tenders, except sawing	1,070	0.29	14	1
Printing press machine setters and set-up operators	340	.09	13	1
Specialty materials printing machine setters and set-up operators	550	.15	17	1
Screen printing machine setters and set-up operators	3,120	.84	6	9
All other printing related setters and set-up operators	230	.06	19	1
Printing press machine operators and tenders	680	.18	15	1
All other printing, binding, and related machine operators and tenders	440	.12	14	1
Sewing machine operators, garment	1,370	.37	23	1
Sewing machine operators, nongarment	9,200	2.49	7	10
Cutting and slicing machine setters and set-up operators	350	.09	18	1
Cutting and slicing machine operators and tenders	1,000	.27	14	1
Coating, painting, and spraying machine setters and set-up operators	880	.24	11	2
Coating, painting, and spraying machine operators and tenders	1,360	.37	8	3
Cleaning, washing, and pickling equipment operators and tenders	360	.10	12	1
Crushing, grinding, mixing, and blending machine operators and tenders	540	.15	18	2
Extruding, forming, pressing, and compacting machine setters and set-up operators	450	.12	20	1
Extruding, forming, pressing, and compacting machine operators and tenders	1,290	.35	28	1
Packaging and filling machine operators and tenders	7,230	1.96	6	9
All other machine setters and set-up operators, except metal and plastic	1,360	.37	17	2
All other machine operators and tenders, except metal and plastic	5,000	1.35	8	4
Precision assemblers, metal	1,110	.30	n.a.	n.a.
Electrical and electronic equipment assemblers, precision	1,110	.30	19	1
Other hand workers, nec	65,640	17.75	n.a.	n.a.
Electrical and electronic assemblers	1,290	.35	14	1
Welders and cutters	2,720	.74	7	9
Solderers and brazers	2,390	.65	7	5
Sewers, hand	400	.11	20	1
Cutters and trimmers, hand	870	.24	11	2
Molders and casters, hand	720	.19	14	1
Painting, coating, and decorating, workers, hand	6,030	1.63	5	19
Engraving and printing workers, hand	580	.16	11	2
Grinding and polishing workers, hand	5,580	1.51	5	10
Assemblers and fabricators, except machine, electrical, electronic, and precision	40,750	11.02	4	21
All other hand workers, nec	4,310	1.17	8	6
Plant and system workers	110	.03	39	[3]
Motor vehicle operators	1,490	.40	n.a.	n.a.
Truck drivers, heavy or tractor trailer	700	.19	9	3
Truck drivers, light, include delivery and route workers	720	.19	7	6
All other motor vehicle operators	70	.02	16	1
All other transportation and motor vehicle operators	70	.02	25	[3]
Material moving equipment operators	2,350	.64	n.a.	n.a.
Hoist and winch operators	160	.04	27	[3]
Industrial truck and tractor operators	1,660	.45	7	4
Conveyor operators and tenders	220	.06	18	1

See footnotes at end of table

Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued

(SIC 39)

Occupation	Employment[1]	Percent of total employment	Relative error (in percentage)[2]	Percent of establishments reporting the occupation
All other material moving equipment operators	310	0.08	20	1
Helpers - mechanics and repairers	340	.09	13	2
Construction trades and extractive worker helpers	220	.06	26	[3]
Machine feeders and offbearers	6,500	1.76	6	9
Freight, stock, and material movers, hand	5,720	1.55	4	17
Hand packers and packagers	18,020	4.87	4	24
All other helpers, laborers, and material movers, hand	8,930	2.42	8	7
All other production, construction, operating, maintenance, and material handling occupations	50	.01	n.a.	n.a.

[1] Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

[2] Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

[3] Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

Appendix A. Survey Methods and Reliability of Estimates

Scope of survey

The survey covered private manufacturing establishments in Standard Industrial Classification (SIC) codes 20-39. The reference date of the survey was the week that included April 12, May 12, or June 12, 1983, depending on the SIC of the sampled unit as shown below:

SIC	*Reference date*
20	June 12
21	June 12
22	April 12
23	April 12
24	May 12
25	May 12
26	April 12
27	May 12
28	June 12
29	May 12
30	June 12
31	April 12
32	May 12
33	April 12
34	June 12
35	June 12
36	June 12
37	June 12
38	April 12
39	May 12

The survey covered all 50 States, the District of Columbia, and Puerto Rico. (Puerto Rico data are not included in the national estimates in this publication.)

Occupational and industrial classification

The OES classification system is based primarily on the Dictionary of Occupational Titles (DOT), Fourth edition, and is compatible with the 1980 Standard Occupational Classification (SOC) system. The DOT was used to develop the definitions of OES occupations because it is the most comprehensive system for classifying occupations. In addition, each OES occupation is directly related to a 1980 census occupation, except in those cases where a census occupation is not within the scope of the OES survey. "Crosswalks" have been developed between the two systems so that users may integrate OES data with data from sources using the Census classification. (See appendix B.)

The industrial classification system is that described in the 1972 edition of the *Standard Industrial Classification Manual,* [1] whereby reporting establishments are classified into industries on the basis of major product or activity.

Concepts

An *establishment* is an economic unit which produces goods or services. Generally, it is at a single physical location and is engaged predominantly in one type of economic activity. Where a single physical location encompasses two or more distinct activities, these are treated as separate establishments if separate payroll records are available and certain other criteria are met.

Employment includes full- and part-time workers; workers on paid vacations or other types of leave; workers on unpaid short-term absences (i.e., illness, bad weather, temporary layoff, jury duty); salaried officers, executives, and staff of incorporated firms; employees temporarily assigned to other units; and employees for whom that unit is their permanent (home) duty station, regardless of whether the unit prepares their paycheck. Excluded from coverage are proprietors (owners and partners of unincorporated firms), self-employed, unpaid family workers, and workers on extended leave (i.e., pensioners and members of the Armed Forces).

Occupation refers to the occupation in which employees are working rather than the occupation for which they may have been trained. For example, an employee trained as an engineer but working as a drafter is reported as a drafter.

Working supervisors (those spending 20 percent or more of their time at work similar to that done by workers under their supervision) are reported in the occupation most closely related to their work.

Part-time workers, learners, and apprentices are reported in the occupation in which they ordinarily work.

Multiple jobholders (employees who perform the duties of two or more occupations in an establishment)

[1] *Standard Industrial Classification Manual* (Office of Management and Budget, Executive Office of the President, 1972), as amended in *Supplement,* 1977.

are reported in the occupation that requires the highest level of skill or in the occupation where the most time is spent if there is no measurable difference in skill requirements.

Survey procedures

The survey is conducted over a 3-year cycle; manufacturing industries are surveyed in one year and nonmanufacturing industries in the other two years. Data are collected from a sample of establishments primarily by mail; telephone followups and personal visits are made when an establishment response is critical to the survey. The survey is based on a probability sample, stratified by industry and size of employment, designed to represent the total or "universe" of establishments covered by the survey. Data are requested for the pay period including the 12th of the reference month, which is standard for all Federal agencies collecting employment data.

Method of collection

Survey schedules were mailed to most sample establishments; personal visits were made to some larger companies. Two additional mailings were sent to nonrespondents at approximately 6-week intervals. Nonrespondents considered critical to the survey (due to size) were followed up by telephone or personal visit.

Sampling procedure

The sampling frame for this survey was the list of units in the specified SIC's as reported to State Unemployment Insurance (UI) agencies. The reference date of the sampling frame was the second quarter of 1983.

The universe was stratified into SIC and size classes. The size classes were determined by employment as follows:

Size class	*Employees*
1	1-3
2	4-9
3	10-19
4	20-49
5	50-99
6	100-249
7	250-249
8	500-999
9	1,000 and over

UI reporting units with 1-3 employees were not sampled in all States, but units with 4-9 employees were given larger weights to represent the employment in the smaller size class. UI reporting units with 250 or more employees were included in the sample with certainty. Sample sizes intended to produce State estimates with target relative errors of 10, 15, and 20 percent at one standard deviation were developed for the noncertainty size classes. This was done for groups of SIC's based on averages of occupational rates and coefficients of variation (CV's) from the previous survey of those SIC's for a set of typical occupations. This SIC sample size was allocated to the size classes proportionally to size class employment. The sample was selected systematically with equal probability within each State/SIC/area/size class cell.

The States were given the option of three target relative errors in designing their samples. Some States varied the target relative error by SIC. This was done to decrease the cost by reducing the sample size. The above allocations resulted in a total initial sample size of 158,023 UI reporting units.

Response

Of those selected, 149,213 were final eligible units (i.e., excluding establishments that were out of business or out of scope, etc.). Usable responses were obtained from 110,305 units, producing a response rate of 73.9 percent based on units and 68.0 percent based on weighted employment. Subsequent to the closeout date for national estimates, additional data were received by States and used in preparing State estimates. Response rates in most States were much higher than the response rate used to develop national estimates.

Estimation

A weight was determined for each sample unit from which a usable response was received. Each weight was composed of two factors. The first factor was the inverse of the probability of selection. The second was the nonresponse adjustment factor, used to correct for questionnaires that were not returned or not usable. For each of the three-digit SIC/State/size class sampling cells, a nonresponse factor was calculated that was equal to:

$$\frac{\text{Weighted sample employment of all eligible units in sample}}{\text{Weighted sample employment of all responding eligible units}}$$

Sample employment was taken from the sampling frame. If the factor in a cell was greater than a predetermined maximum factor, which increased as the number of respondents in a cell increased, the cell was collapsed with other homogeneous cells within the SIC until the factor for the combined cells was not greater than the appropriate maximum factor. If the collapsing procedure terminated (i.e., no more cells were available for collapse) before satisfying the above constraint, then the appropriate maximum factor was used. For size classes 1-6, homogeneous cells were determined to be other *size* cells within the SIC and State. For size classes 7-9,

homogeneous cells were determined to be other *State* cells within the SIC and size class. The weight for each establishment was the product of the two factors.

A combined ratio estimate of occupational employment was used to develop the national estimates. The auxiliary variable used was total employment. The estimating formula is:

$$\hat{p} = \sum_i \left[\frac{\sum_j \sum_k w_{ijk} P_{ijk}}{\sum_j \sum_k w_{ijk} e_{ijk}} \cdot M_i \right]$$

Where:
- $\hat{p}$ = 2-digit industry occupational employment estimate
- i = 3-digit industry within a 2-digit industry
- j = size class
- k = establishment
- w_{ijk} = weight after nonresponse adjustment in i-th industry, j-th size class and k-th establishment
- P_{ijk} = occupational employment in i-th industry, j-th size class and k-th establishment
- e_{ijk} = total employment in i-th industry, j-th size class and k-th establishment
- M_i = population total employment in i-th industry

The population value of total employment (M_i) was obtained from the BLS Current Employment Statistics program, a monthly employment survey of nonagricultural establishments.

The standard form for the sampling variance for a combined ratio estimate is:

$$V(\hat{p}) = \sum_i \sum_j \frac{N^{ij2} (1 - f_{ij})}{n_{ij}} \cdot A_{ij}$$

$$A_{ij} = S_{pij}^2 + R_i^2 S_{eij}^2 - 2R_i K_{ij} S_{pij} S_{eij}$$

Where:
- $V(\hat{p})$ = variance of $\hat{p}$
- i = 3-digit industry within a 2-digit industry
- j = size class
- N_{ij} = total number of units in the i-th industry and j-th size class
- f_{ij} = sampling fraction in the i-th industry and j-th size class
- n_{ij} = number of sample units in the i-th industry and j-th size class
- S_{pij} = standard deviation of p within the i-th industry and j-th size class
- S_{eij} = standard deviation of e within the i-th industry and j-th size class
- K_{ij} = correlation coefficient between p and e within the i-th industry and j-th size class.

The variances for the occupational estimates were estimated from the following formula:

$$\text{Var}(\hat{P}) = \sum_i \sum_j T_{ij} V_{ij}^2$$

$$T_{ij} = [B_{ij}] \cdot [D_{ij}] \cdot [F_{ij}]^2$$

$$B_{ij} = (M_{ij} - e_{ij})/(M_{ij})$$

$$D_{ij} = (G_{ij})/(H_{ij})$$

$$G_{ij} = \left(\sum_k w_{ijk}^2\right)\left(\sum_k w_{ijk}\right)$$

$$H_{ij} = \left(\sum_k w_{ijk}\right)^2 - \left(\sum_k w_{ijk}^2\right)$$

$$F_{ij} = (M_i) \Big/ \left(\sum_j \sum_k w_{ijk} e_{ijk}\right)$$

$$V_{ij}^2 = \sum_k w_{ijk} \cdot L_{ijk}^2$$

$$L_{ijk} = (P_{ijk} - R_i e_{ijk}) - (\bar{P}_{ij} - R_i \bar{e}_{ij})$$

Where:
- M_{ij} = benchmark total employment in the i-th industry and j-th size class
- $R_i = \left(\sum_j \sum_k w_{ijk} P_{ijk}\right) \Big/ \left(\sum_j \sum_k w_{ijk} e_{ijk}\right)$
- $e_{ij} = \sum_k e_{ijk}$

All other terms are as defined above. This formula is almost a computational form of the standard formula given above. One simplifying assumption has been made:

$$W_{ijk} = C_{ij} \text{ for all k in a given ij cell}$$

That is, the weights are equal to a constant C within a given three-digit industry/size class cell. At this time, the total effect of this assumption on the variance estimates has not been measured.

Reliability of estimates

Estimates developed from the sample may differ from the results of a complete survey of all the establishments in the sampled lists. Two types of errors, sampling and nonsampling, are possible in an estimate based on a sample survey. Sampling error occurs because observations are made only on a sample, not on the entire population. Nonsampling error can be attributed to many sources, e.g., inability to obtain information about all cases in the sample; differences in the respondents' interpretation of questions; inability of respondents to provide correct information; errors in recording, coding, or processing the data; errors in estimating values for missing data; and failure to represent all units in the population.

The particular sample used in this survey is one of a large number of all possible samples of the same size that could have been selected using the same sample design. Estimates derived from the different samples

would differ from each other; the difference between a sample estimate and the average of all possible sample estimates is called the sampling deviation. The standard or sampling error of a survey estimate is a measure of the variation among the estimates from all possible samples. The relative standard error is defined as the standard error of the estimate divided by the value being estimated; the variance is defined as the standard error squared.

The sample estimate and an estimate of its standard error enable one to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples that could be obtained from the sample design for the survey.

To illustrate, if all possible samples were selected, and if each of these were surveyed under essentially the same conditions and an estimate and its estimated sample error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below to one standard error above the derived estimate would include the average value of all possible samples. This interval is called a 68-percent confidence interval.

2. Approximately 90 percent of the intervals from 1.6 standard errors below to 1.6 standard errors above the derived estimate would include the average of all possible samples. This interval is called a 90-percent confidence interval.

3. Approximately 95 percent of the intervals from two standard errors below to two standard errors above the derived estimate would include the average of all possible samples. This interval is called a 95-percent confidence interval.

4. Almost all intervals from three standard errors below to three standard errors above the derived estimate would include the average of all possible samples.

An inference that the complete coverage value would be within the indicated ranges would be correct in approximately the relative frequencies shown.

For example, suppose an estimated total is shown as 5,000 with an associated relative error of 2 percent. Then the standard error is 100 (2 percent of 5,000) and there is a 68-percent chance that the average of all possible sample totals would be between 4,900 and 5,100, and it is almost certain that the average of all possible sample totals would be between 4,700 and 5,300.

The relative errors provided primarily indicate the magnitude of the sampling error, but do not measure biases in the data due to nonsampling error. Efforts were made to reduce the biases due to errors in recording, coding, and processing the data. The adjustment made for nonrespondents assumed that the characteristics of the nonrespondents were the same as those of the respondents at a given level. To the extent this is not true, bias is introduced in the data. The magnitude of these biases is not known.

Particular care should be exercised in the interpretation of small estimates, estimates based on a small number of cases, or small differences between estimates because the sampling errors are relatively large and the magnitude of the biases is unknown.

Appendix B. The OES Classification System

The new OES system (with an entirely new 5-digit coding system) organizes all occupations into four levels: Division, major group, minor group, and detail. The following sections discuss the first three levels, and also explain the new coding structure.

Division level

There are seven divisions in the new OES system:

1. Managerial and administrative occupations
2. Professional, paraprofessional, and technical occupations
3. Sales and related occupations
4. Clerical and administrative support occupations
5. Service occupations
6. Agriculture, forestry, fishing, and related occoccupations
7. Production, construction, operating, maintenance, and material handling occupations

Some of the more significant changes made at the division level are:

- The exclusion of first-line managers/supervisors from the managerial and administrative division. These workers are classified in separate and specific categories in the other divisions. For example, in the second division, first-line managers/supervisors are classified with the workers they supervise.

- The combination of professional and technical workers into a single integrated division in order to lessen the growing ambiguity between the two categories.

- The creation of a new agriculture division which allows supplementation of data from non-OES survey sources.

- The significant organizational and occupational revision of the production division.

Major and minor group levels

A significant amount of change has taken place at the major and minor group levels, particularly in restructuring. Since it would be impossible to describe every change in this appendix, some of the highlights of the major and minor group structure of each division are given below:

Managerial and administrative occupations. This division is organized into three major groups. The first contains specialized occupations by function, and the second contains specialized occupations by industry. Both of these categories are generally at the middle management level. When function and industry overlap, function takes precedence and is listed first. The third and final group includes the division residual as well as workers, usually in upper management, whose duties are more general in nature.

Professional, paraprofessional, and technical occupations. This division is organized into 9 major groups and a residual category. These major groups were created by combining those professional, paraprofessional, and technical occupations requiring common bodies of knowledge and expertise. Unlike the Standard Occupational Classification (SOC) system, distinctions between technical and professional workers, if made, are found at the minor group level rather than at the major group or division level.

The first major group is management support. This group was placed in the professional division rather than the managerial division, as in the SOC, for it was felt that respondents consider individual management support occupations functionally closer to the professional specialties of the division than to the upper and middle management occupations of the first division. The management support group also includes a residual allowing the combination of this major group with the management division, if SOC compatibility is required.

The remaining major groups primarily follow SOC order: "Hard" sciences, including engineering; the social sciences and related disciplines, such as law and teaching; health fields; and, writing, art, and related fields. The two exceptions to the SOC order, the technician and computer groups, were moved so that these occupations would appear in closer proximity to the occupations they most commonly support.

Sales and related occupations. The SOC arranges the sales division into four segments:

Supervisory; sale of most services; sale of retail products; and sales-related occupations. In both the new OES system and the SOC, retail sales is not an industry designation but rather an occupational designation for sales activities which are directed towards individuals rather than organizations or businesses.

Unlike the SOC, the new OES system includes all service sales occupations in the major groups as "sales occupations, service."

In addition, a new major group was created by combining the last three SOC categories because they involve the sale of products rather than services. A few sales-related occupations such as demonstrators have also been included in this new group.

The new OES sales division is somewhat larger in scope than the previous OES category because of the addition of occupations such as sales engineers and cashiers. These additions to the sales group in the new OES structure do not, however, diminish the magnitude of the increase in sales personnel in manufacturing industries between 1980 and 1983.

Clerical and administrative support occupations. This division is organized into six major groups and a residual category. As with the other divisions, the supervisory category is first. The next major group includes industry-specific clerical occupations. This group is placed near the top of the clerical division so that respondents can more easily locate these occupations. These two major groups are followed by the general secretarial and related group, an office machine group, a communications group, and a material recording group.

Service occupations. The previous OES system included protective services, food service, and cleaning service occupations as summary occupational groups. The new system includes these as major groups and adds health and personal service occupations, while expanding the cleaning group to encompass building service organizations.

Agriculture, forestry, fishing, and related occupations. Because many of the occupations related to this division are found in industries outside the scope of the OES survey, the previous OES system coding structure had no comparable category. At present, the division covers only those occupations needed for the OES survey as defined by its current nonagricultural scope. In the 1983 manufacturing survey, for example, only the lumber and wood products industry (SIC 24) and, to a lesser degree, food and kindred products (SIC 20) had significant employment in this category.

Production, construction, operating, maintenance, and material handling occupations. As in the previous OES system, this is the largest and most diverse of all the OES divisions. The major groups are listed below:

Supervisory
Inspecting
Repair
Construction and extraction
Precision production
Machine setting and operating
Assembling and handworking
Plant and system operation
Transportation and material handling
Helpers and laborers

To understand the organization of this division, it is important to be familiar with SOC principles. The first basic principle of organization is that occupations are grouped by function (e.g. inspecting, repairing, producing). An equally important principle is organization by skill requirements (e.g. precision, setup, operating, helping).

A third organizing principle in many of these groups is the distinction made between machine and hand operations. In this case, hand operations include the use of hand-held power tools. The hand and machine categories are not exhaustive, however, since both precision hand work and precision machine work are placed in the same category. For OES purposes, an exception to the SOC placement was made, and precision assembling occupations were placed in the handworking category, allowing for proximity to the other assembling occupations.

The SOC and the new OES systems also distinguish between "manual" occupations, such as material handling, and "hand" occupations, such as grinding. Here, the distinction is made according to whether or not the worker is directly working on the manufacture of a product.

Within the large production and precision and machine groups, distinctions are made on the basis of materials worked (e.g. metal/plastic, wood, textile, assorted/other). The assorted/other category includes working with combined materials as well as working with single materials, such as stone, which have not previously been specified.

Appendix C. OES Survey Data Available from State Agencies

State data on occupational employment in manufacturing are available as indicated below. These reports may be obtained from the State employment security agencies listed on the inside back cover of this publication.

Table C-1. OES survey data available by State and year

State	1971	1974	1977	1980	1983	State	1971	1974	1977	1980	1983
Alabama		x	x	x	x	Montana				x	x
Alaska	x	x	x	x	x	Nevada	x	x	x	x	x
Arizona			x	x	x	New Hampshire			x	x	x
Arkansas			x	x	x	New Jersey	x	x	x	x	x
California			x		x	New Mexico			x	x	x
Colorado	x	x	x	x	x	New York		x	x	x	x
Connecticut			x	x	x	North Carolina		x	x	x	x
Delaware		x	x	x	x	North Dakota			x	x	x
District of Columbia		x	x	x	x	Nebraska				x	x
Florida	x	x	x	x	x	Ohio				x	x
Georgia		x	x	x	x	Oklahoma	x	x	x	x	x
Hawaii			x	x	x	Oregon	x	x	x	x	x
Idaho		x	x	x	x	Pennsylvania		x	x	x	x
Illinois			x	x	x	Puerto Rico					x
Indiana	x	x	x	x	x	Rhode Island			x	x	x
Iowa				x	x	South Carolina	x	x	x	x	x
Kansas				x	x	South Dakota				x	x
Kentucky		x	x	x	x	Tennessee		x	x	x	x
Louisiana			x	x	x	Texas		x	x	x	x
Maine		x	x	x	x	Utah	x	x	x	x	x
Maryland		x	x	x	x	Vermont				x	x
Massachusetts	x	x	x	x	x	Virginia	x	x	x	x	x
Michigan			x	x	x	Washington				x	x
Minnesota	x	x	x	x	x	West Virginia	x	x	x	x	x
Mississippi		x	x	x	x	Wisconsin	x	x	x	x	x
Missouri	x	x	x	x	x	Wyoming			x	x	x

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Occupational Employment Statistics (OES) Program

BLS Region		
IV	ALABAMA	- Department of Industrial Relations, Industrial Relations Building, Room 427, Montgomery 36130
X	ALASKA	- Employment Security Division, Department of Labor, P.O. Box 1149, Juneau 99802
IX	ARIZONA	- Department of Economic Security, P.O. Box 6123, Phoenix 85005
VI	ARKANSAS	- Employment Security Division, Department of Labor, State Capitol Mall, P.O. Box 2981, Little Rock 72203
IX	CALIFORNIA	- Employment Development Department, P.O. Box 1679, Sacramento 95808
VIII	COLORADO	- Division of Employment and Training, 1330 Fox Street, Denver 80204
I	CONNECTICUT	- Employment Security Division, Labor Department, 200 Folly Brook Boulevard, Wethersfield 06109
III	DELAWARE	- Department of Labor, University Plaza Office Complex, P.O. Box 9029, Newark 19711
III	DIST. OF COL.	- Division of Labor Market Information, Research and Analysis, Department of Employment Services, 500 C Street, N.W., Room 411, Washington 20001
IV	FLORIDA	- Department of Labor and Employment Security, 2574 Seagate Drive, Room 201, Tallahassee 32301
IV	GEORGIA	- Department of Labor, 254 Washington Street, S.W., Atlanta 30334
IX	HAWAII	- Department of Labor and Industrial Relations, 830 Punchbowl Street, Room 304, Honolulu 96813
X	IDAHO	- Department of Employment, 317 Main Street, P.O. Box 35, Boise 83735
V	ILLINOIS	- Bureau of Employment Security, 910 South Michigan Avenue, 12th Floor, Chicago 60605
V	INDIANA	- Employment Security Division, 10 North Senate Avenue, Indianapolis 46204
VII	IOWA	- Department of Job Service, 1000 East Grand Avenue, Des Moines 50319
VII	KANSAS	- Department of Human Resources, 401 Topeka Avenue, Topeka 66603
IV	KENTUCKY	- Division for Unemployment Insurance, Cabinet for Human Resources, 275 East Main Street, Frankfort 40621
VI	LOUISIANA	- Department of Labor, P.O. Box 44094, Capitol Station, 1001 North 23rd Street, Baton Rouge 70804
I	MAINE	- Bureau of Employment Security, Department of Labor, 20 Union Street, Augusta 04330
III	MARYLAND	- Department of Human Resources, Employment Security Administration, 1100 North Eutaw Street, Baltimore 21201
I	MASSACHUSETTS	- Division of Employment Security, Charles F. Hurley Building, Government Center, Boston 02114
V	MICHIGAN	- Employment Security Commission, 7310 Woodward Avenue, Detroit 48202
V	MINNESOTA	- Department of Economic Security, 390 North Robert Street, St. Paul 55101
IV	MISSISSIPPI	- Employment Security Commission, P.O. Box 1699, Jackson 39205
VII	MISSOURI	- Division of Employment Security, P.O. Box 59, Jefferson City 65104
VIII	MONTANA	- Department of Labor and Industry, P.O. Box 1728, Helena 59601
VII	NEBRASKA	- Division of Employment, Department of Labor, P.O. Box 94600, Lincoln 68509
IX	NEVADA	- Employment Security Department, 500 East Third Street, Carson City 89713
I	NEW HAMPSHIRE	- Department of Employment Security, 32 South Main Street, Concord 03301
II	NEW JERSEY	- Department of Labor, P.O. Box 2765, Trenton 08625
VI	NEW MEXICO	- Employment Security Department, P.O. Box 1928, Albuquerque 87103
II	NEW YORK	- Division of Research and Statistics, Department of Labor, State Campus, Building 12, Albany 12240
IV	NORTH CAROLINA	- Employment Security Commission, P.O. Box 25903, Raleigh 27611
VIII	NORTH DAKOTA	- Job Service, P.O. Box 1537, Bismarck 58502
V	OHIO	- Bureau of Employment Services, P.O. Box 1618, Columbus 43216
VI	OKLAHOMA	- Employment Security Commission, 310 Will Rogers Memorial Office Building, Oklahoma City 73105
X	OREGON	- Employment Division, Department of Human Resources, 875 Union Street, N.E., Salem 97311
III	PENNSYLVANIA	- Department of Labor and Industry, Seventh and Forster Streets, Harrisburg 17121
II	PUERTO RICO	- Bureau of Employment Security, 505 Munoz Rivera Ave., 15th Floor, Hato Rey 00918
I	RHODE ISLAND	- Department of Employment Security, 24 Mason Street, Providence 02903
IV	SOUTH CAROLINA	- Employment Security Commission, P.O. Box 995, Columbia 29202
VIII	SOUTH DAKOTA	- Department of Labor, P.O. Box 1730, Aberdeen 57401
IV	TENNESSEE	- Department of Employment Security, Cordell Hull Office Building, Room 519, Nashville 37219
VI	TEXAS	- Employment Commission, 15th and Congress Avenue, Austin 78778
VIII	UTAH	- Department of Employment Security, P.O. Box 11249, Salt Lake City 84147
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III	VIRGINIA	- Employment Commission, P.O. Box 1358, Richmond 23211
X	WASHINGTON	- Employment Security Department, 212 Maple Park, Olympia 98504
III	WEST VIRGINIA	- Department of Employment Security, 112 California Avenue, Charleston 25305
V	WISCONSIN	- Department of Industry, Labor, and Human Relations, P.O. Box 7944, Madison 53707
VIII	WYOMING	- Employment Security Commission, P.O. Box 2760, Casper 82602